

# FLIGHT

## The AIRCRAFT ENGINEER AND AIRSHIPS

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Founder and Editor: STANLEY SPOONER

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### EDITORIAL COMMENT



#### Flying Boats

THE development of the flying boat is a subject which FLIGHT has always had at heart. To deprecate anything which genuinely makes for that development is the last thing of which we should wish to be accused. Our belief is that the British Empire has a real need for flying boats to help in the solution of the problems which must beset an Empire scattered about the world, built up by sea enterprise, and with its various units separated from each other by the seven seas of the world. The ships which brought about the creation of this Empire were good enough in their time to maintain its unity, but, in the modern age of speed, they no longer suffice. British Empire communications must be maintained by cable, by wireless, and by sea-going aircraft. By sea-going aircraft we mean, for the present, flying boats and airships, if either or both prove themselves capable of performing the work. If the Armstrong seadromes ever become practical propositions, then the claims of the land-plane will also have to be considered; but the time is not yet ripe to take that possibility into account. Airships must wait until the report on the loss of R 101 gives us a line as to whether it will be worth our while to continue work upon that form of aircraft, or perhaps until the experiments of the Germans and Americans have reached some point at which success or failure is clearly indicated. At the moment, interest is centred on the prospects of the flying boat.

This interest has been intensified, at least in the minds of the lay public, by the visit to British waters of the Dornier Do. X, and the announcement that it is intended to make an attempt to fly this boat across the Atlantic. We have given a full technical account of this boat before now (*i.e.*, in our issue of February 21), and it is not necessary to go over the same ground again. We may briefly mention that the boat is an experiment in size, but does not embody new aeronautical ideas. We welcome the experiment, for size itself must introduce some factors

### DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1930	
Nov. 14	.. Central Flying School Reunion Dinner at Jules', Jermyn Street, London.
Nov. 19	.. "Theory of Flight," Lecture by Capt. F. T. Hill, before London Gliding Club.
Nov. 20	.. "Recent Developments in Engine Cooling," Lecture, by Capt. H. Swan, before R.Ae.S.
Nov. 20	.. "Aircraft Detail Design—The Shops' Viewpoint," Lecture, by W. G. Gibson, before Westland Aircraft Soc.
Nov. 25	.. Norfolk and Norwich AeC. Annual Ball, Andrews Hall, Norwich.
Nov. 28	.. "Importance of the Boundary Layer," Lecture by H. Glauert, before R.Ae.S., Hull.
Nov. 28	.. "Wapiti in India," Lecture, by Gr.-Capt. R. H. Verney, before Westland Aircraft Soc.
Dec. 4	.. "The Four-Foot Wind Tunnel," Lecture by H. Glauert, before R.Ae.S.
Dec. 5	.. No. 3 Squadron R.A.F. Officers' Reunion Dinner, Trocadero.
Dec. 5	.. "Recent Long-Distance Flights," Lecture, by Capt. C. D. Barnard, before Westland Aircraft Soc.
Dec. 11	.. "Axial Engines," Lecture by M. L. Bramson, before R.Ae.Soc.
Dec. 11	.. "Float and Boat Seaplanes," Lecture, by Mr. Jackson, before Westland Aircraft Soc.
Dec. 12	.. Hampshire AeC. Dinner and Dance at South Western Hotel, Southampton.
Nov. 28- Dec. 14	.. Paris Aero Show.
Dec. 17	.. "Soaring Bird Flight," Lecture by Sir G. Walker, before London Gliding Club.

to which we are at least unaccustomed. The other most notable feature about the machine is the heavy loading on wings and engines in which Dr. Dornier has indulged, and which do not commend themselves to British designers. There is no miracle about the boat, but she is a very interesting craft, none the less. Of her range, now that she has been re-equipped with 600-h.p. engines, we have no precise information.

It seems to us that the proper function of an experimental craft is to perform feats which are calculated to be well within her powers. Much useful information might be gained by flights over more or less sheltered waters, where moderate but not extreme degrees of roughness would be experienced. Lessons might also be learnt by mooring tests, and also by refuelling tests in such conditions. Though the landing speed must be high, and we believe it is about 100 m.p.h., the size of the hull should make this boat indifferent to waves which might trouble a smaller craft. A complete study of all such matters would provide much useful knowledge. In particular, we think that repeated practice in refuelling when afloat, until the technique of the operation had been thoroughly worked out and the crew trained to a high degree of skill in it, would serve a very useful purpose. We mean, of course, practice in refuelling when the water was not dead calm, but was not dangerously rough. Knowledge, based on experience, of the degree of roughness in which refuelling could be successfully carried out, would be distinctly valuable. We have no doubt that the Do. X has been refuelled many times when afloat, but we do not know whether tests have been made of the degree of roughness in the water which makes the operation impracticable.

There is another use to which an experimental craft can be put, and that is testing to destruction. This, if it is to be carried out, should be carried out deliberately, and with due precautions to see that no lives will be lost in the process. We do not think it right that risks of unintentional destruction should be run. In other words, aircraft should not be asked to perform feats for which they were not specifically designed and which are not certainly within their powers. The flights of the Fairey-Napier long-distance monoplane were justified; so was the Atlantic flight of R 100. Failure in such attempts, if it occurs, does not condemn the attempt. It does not

make us say that such an attempt ought not to have been made. But we cannot see that there is any justification for attempting to fly the Do. X across the Atlantic. It is true that she has been designed to lift unprecedented weights, at the cost of heavy loading and all that that implies. The weight can consist of fuel, and so, up to the amount of that fuel, the Do. X may be called a long-distance aircraft. Her capacity, however, is not enough to take her across the Atlantic, even with a halt at the Azores. She is, we are told, to be refuelled at sea from a tanker, and, as we have said, we do not know what experience has been accumulated of refuelling in moderately rough water. If she cannot be refuelled, she will be left helpless on the surface. Though she is multi-engined to an unprecedented extent, she is certainly not thereby made immune from forced landings. When fully loaded, she would probably require all her 12 engines to keep her in flight. It is not a reassuring thought that there are 12 chances of engine failure. If it should happen that she is obliged to come down on a rough Atlantic, the task of the pilot in landing her at 100 m.p.h. is not one which many men would envy. And, if she got safely down, the final question is, how long would her stabilizers enable her to live in an angry sea? There are too many unpleasant possibilities about this flight for our taste.

If all goes well, and we most sincerely pray that nothing untoward will happen, the success of the flight will not prove anything. It will merely be a case of escaping the worst. The Do. X cannot carry a commercial load across the Atlantic. She cannot be sure of remaining in the air for her stages. She cannot be sure that she can take on fuel. She cannot be sure that she can live out any seas upon which she may be obliged to alight. Her success will not enhance the reputation of the flying boat; her failure ought not to damage that reputation in the eyes of those who know, but would certainly produce a very bad impression on the minds of the public. Why, we ask, should such risks be run, when there is so little to gain and so much to lose?

Finally, the weather over the Atlantic at this time of year is not to be depended upon. We credit those in charge of the Do. X with sufficient prudence to believe that they will not let the boat start if the weather forecasts are at all dubious.

#### France's Air Force

MEMBERS of the Finance Committee of the French Chamber have been criticising the organization and equipment of France's air force. The Premier, M. Tardieu, and the Air Minister, Sir Laurent Eynac, have appeared before the committee to answer these criticisms. The impression has become general that the interests of the air force have been subordinated to those of civil flying. The air force is still largely equipped with machines of types designed soon after the war. If these are properly maintained, the age of the type ought not to cause accidents; but many accidents have taken place lately, and this in part has led to this investigation by the Finance Committee of the Chamber.

#### Singapore Base

THE Political Correspondent of the *Daily Telegraph* understands that work on the Singapore naval base is to proceed, with certain modifications. A committee of the Imperial Conference has considered the question, and the delegates from Australia and New Zealand are understood to have pressed for the completion of the base. Singapore is an important Air Force station, as well as a naval base.

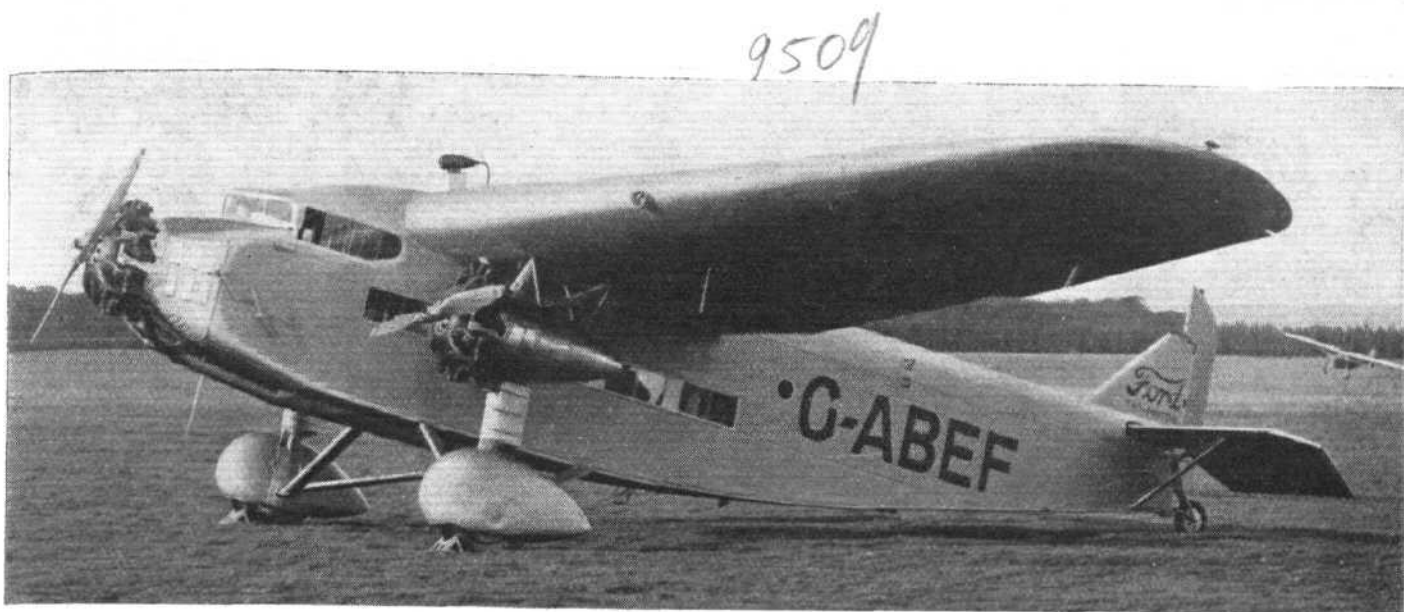
#### Secretary of State for Air: Parliamentary Private Secretary

THE Air Ministry announces: The Rt. Hon. Lord Amulree, G.B.E., K.C., Secretary of State for Air, has appointed Mr. J. R. Oldfield, M.P., to be his Parliamentary Private Secretary, and Mr. I. V. H. Campbell to be his Assistant Private Secretary.

#### An Exceptional Issue

WE wish specially to draw our readers' attention to the fact that next week's issue will be a comprehensive number describing all British aircraft and their accessories. This will be printed in English, French and Spanish, in view of the fact that a very great deal of the aeronautical interest of the world will be centred at the forthcoming Paris Show and Buenos Aires Exhibition. This number will be exceptional in every way, and, being profusely illustrated, should serve as a very comprehensive guide to the British aircraft industry for some time to come. It behoves everyone who is interested in aviation to make sure of obtaining their copy, and if they have not already placed a definite order for it, to do so without delay. The price for single copies will be 1s., but subscribers will, of course, receive it without extra charge.





TYPE 4-AT-E: Fitted with three Wright "Whirlwind" engines, this is the smaller of the two machines now in Europe. (FLIGHT Photo.)

## FORD THREE-ENGINED MONOPLANES

### Two Types Described

A FEW weeks ago we recorded the arrival in this country of two Ford three-engined monoplanes, intended for demonstration work in Great Britain and on the Continent. The machines were shipped to Ellesmere Port, there unloaded and wheeled by road the short distance to Hooton Park Aerodrome (where the Comper Aircraft Co., Ltd., had placed hangars at the disposal of the Ford Company) assembled and flown to London. It is the intention of the Ford Motor Co., if experience appears to justify so doing, to repeat the process with any machines which may be sold to European countries, and Hooton Park is ideally situated for the purpose, being within a couple of miles of Ellesmere Port on the Mersey, and within easy flying distance of any of the London aerodromes.

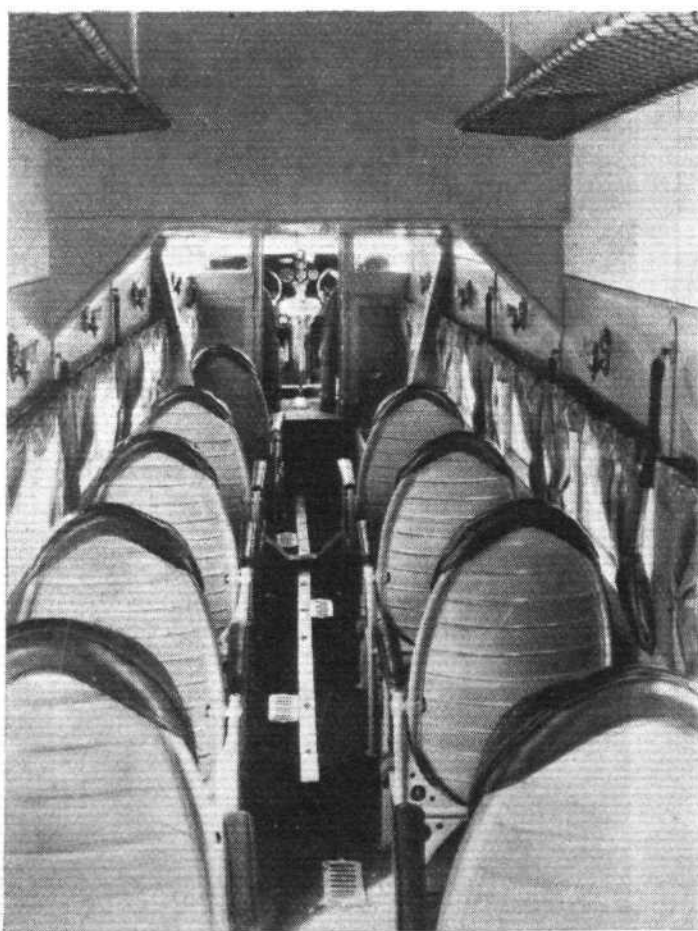
The aviation department of the Ford Motor Company is of fairly recent establishment, and is presided over by Mr. G. W. Higgs, who is ably assisted by Mr. R. L. Carter, whose aviation experience was largely gained with Imperial Airways, Ltd. The aviation offices are in the new Ford House, in Regent Street. For the present it is not, we understand, the intention to start manufacture in England, but as the three-engined Ford machines have established a very good reputation in America, there is cause to believe that very considerable business will be done in Europe, and the possibility is certainly not excluded of laying down a manufacturing plant in this country. We do not know that the new Ford works at Dagenham are planned with the idea of including an aircraft section, but as they will be on a vast scale, it should not be difficult, should the need

arise, to set aside a portion of them for aircraft construction.

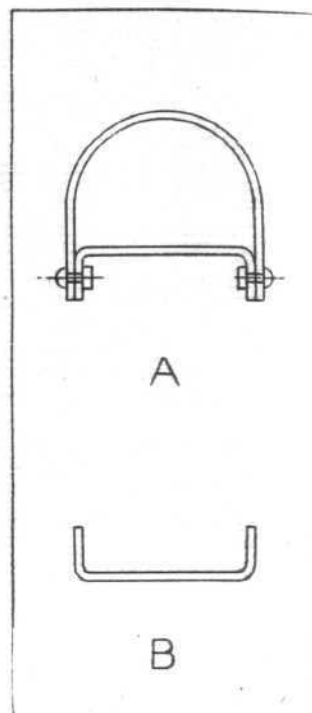
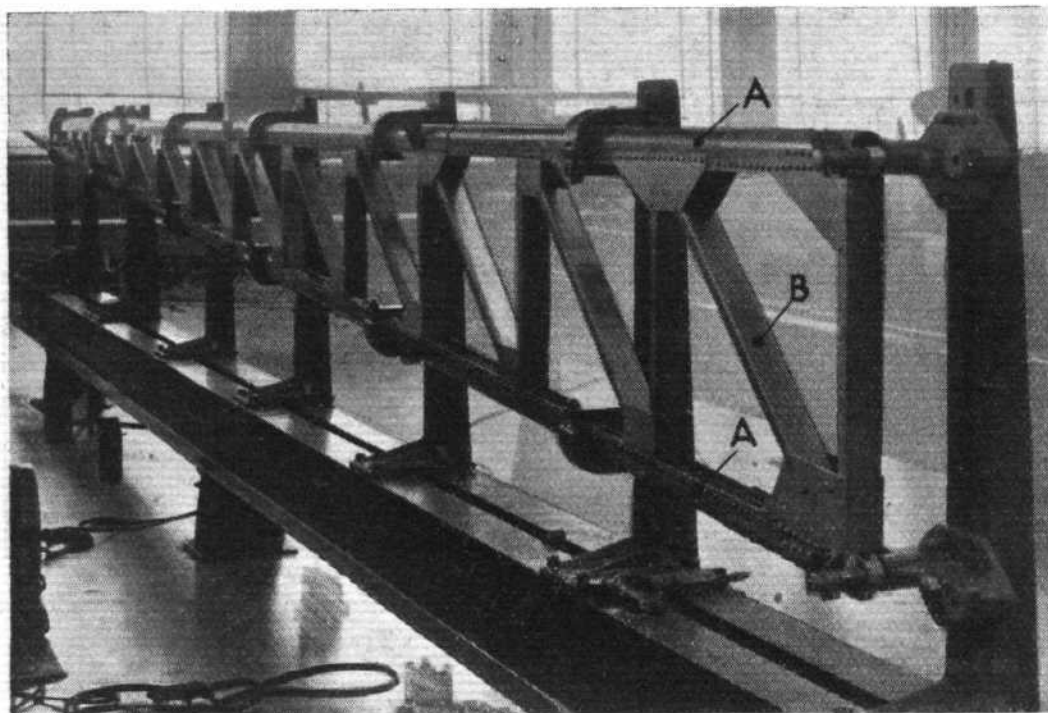
While the two machines were at Hooton Park, our representatives had the opportunity to examine them while they were being erected, and it was largely on the occasion of that visit that the material for the present article was collected.

The two Ford monoplanes at present in Europe are generally similar except for their power plants, the extent of the

passenger accommodation, and the wing areas. The smaller machine of the two is known as the type 4-AT-E, and the larger as the type 5-AT-C. The former is fitted with three Wright "Whirlwind" engines, while the latter has three Pratt & Whitney "Wasps." The smaller machine has seating accommodation for 11 passengers, while in the larger the number of seats can be 13 to 15, according to requirements. The manner in which, in the larger machine, the wing area is increased to carry the greater load of more passengers and more powerful engines is interesting. The Ford design includes a wing centre-section permanently attached to the fuselage, and carrying the outboard engines. To this centre-section are attached, by six bolts each, the two outer wing portions. These outer wing portions are a standard size, identical for the smaller and larger machine, and the extra area is obtained solely by increasing the span of the centre-section. While this arrangement limits the increase in area that is possible, it is actually a sound way of increasing area because it increases the span, and thus decreases the induced drag at low speeds



THE CABIN: In the floor may be seen the special louvres which admit warm air. The open door shows a little of the pilots' cockpit.



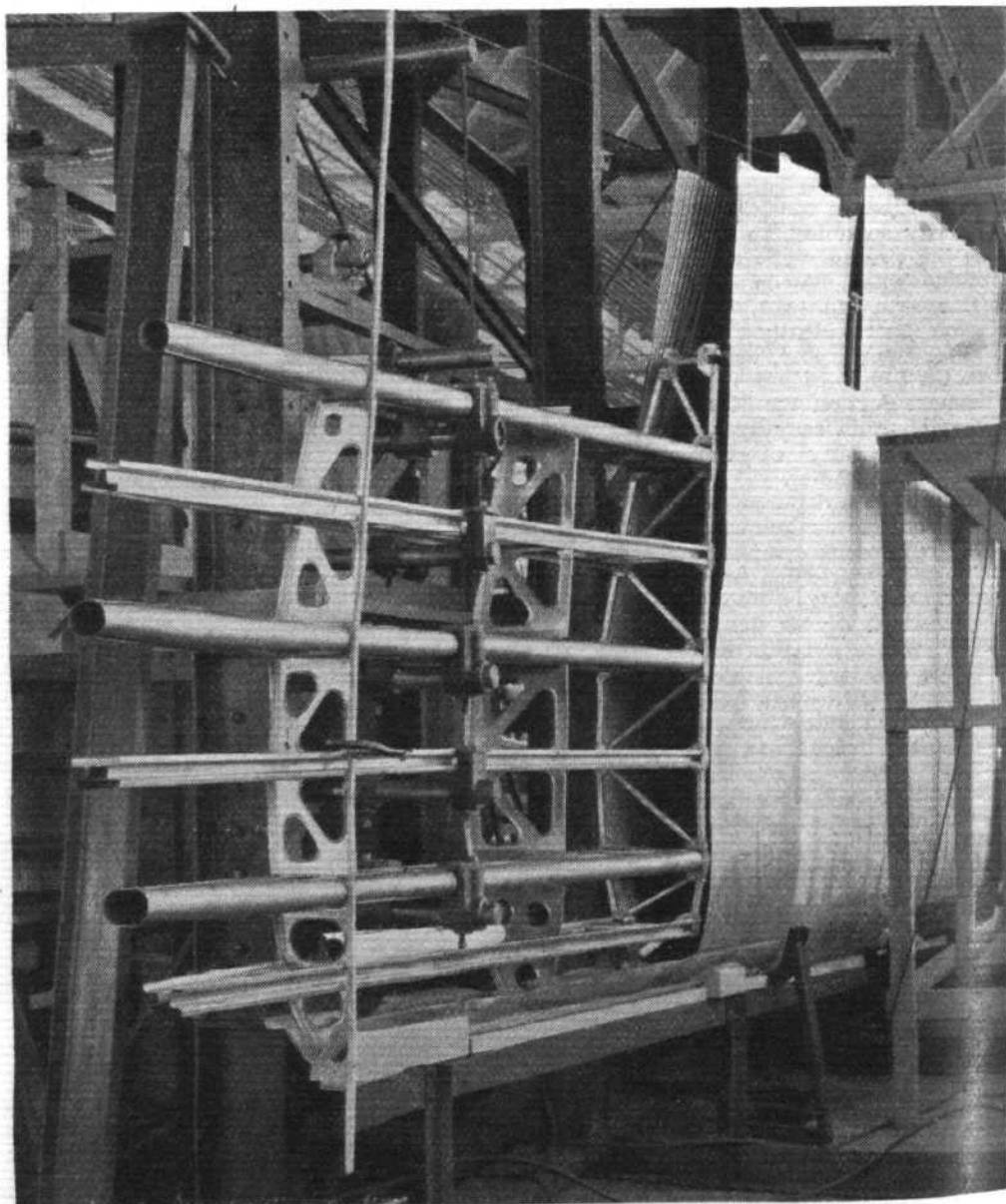
**FORD WING SPAR CONSTRUCTION** Built of Duralumin, the spar has "D"-section flanges, as shown on the right in A, while the vertical and diagonal struts are plain channel sections, as in B.

It does not, of course, add materially to the maximum lift coefficient, and as the increase in weight is greater than the increase in area, the stalling speed of the larger machine is greater than that of the smaller.

Aerodynamically, the Fokker tri-motor monoplanes are of about average fineness. For example, the Everling "High-speed Figure" is 13.6 for the "Whirlwind"-engined machine and 15.8 for the larger monoplane. Neither figure is exceptionally high, but neither is it unusually low, and the minimum drag coefficient appears to be about what one would expect.

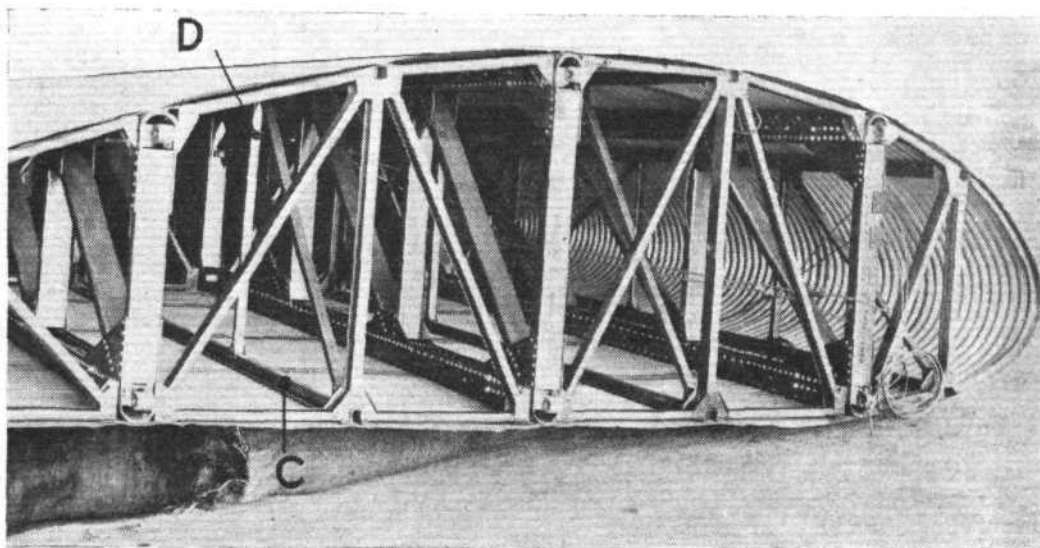
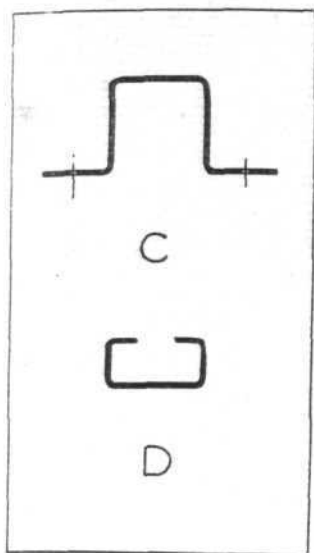
From the point of view of structural efficiency, the machines appear to be good, more especially, perhaps, the larger, which has a ratio of gross weight to tare weight of 1.8 which is above the average. For the smaller machine the figure is 1.56. The wing loading of the 4-AT-E is 12.9 lb./sq. ft., and the power loading 11.3 lb./h.p. For the type 5-AT-C the figures are 16.2 lb./sq. ft. and 11.7 lb./h.p. respectively. The speed range of both machines must be regarded as good, being 2.3:1 for the smaller machine and nearly 2.4:1 for the larger. The actual performance figures are given in the table on page 1236, from which it will be seen that the smaller machine has a top speed of 132 m.p.h. with a cruising speed of 107 m.p.h., while the larger has a top speed of 152 m.p.h., and cruises at 122 m.p.h.

The "Wasp"-engined machine in particular should be a very useful type, with its high-cruising speed. It is becoming more and more evident that the figure of 100 m.p.h. for cruising speed which became accepted many years ago, is scarcely sufficient



**A WING TIP NEARING COMPLETION :** Note the type of rib used near the wing tip, and the disappearance, due to taper, of the N girders of the spars.





**FORD WING CONSTRUCTION:** There are three main spars, built up as shown on p. 1234, and between them light stringers of U section, as in C. The struts of the stringer system are of the section shown in D.

under modern conditions if a real saving in time is to be achieved, and a cruising speed of 100 m.p.h. would not be enough on some of the sections of British Empire routes, for example, although it should be ample for many European

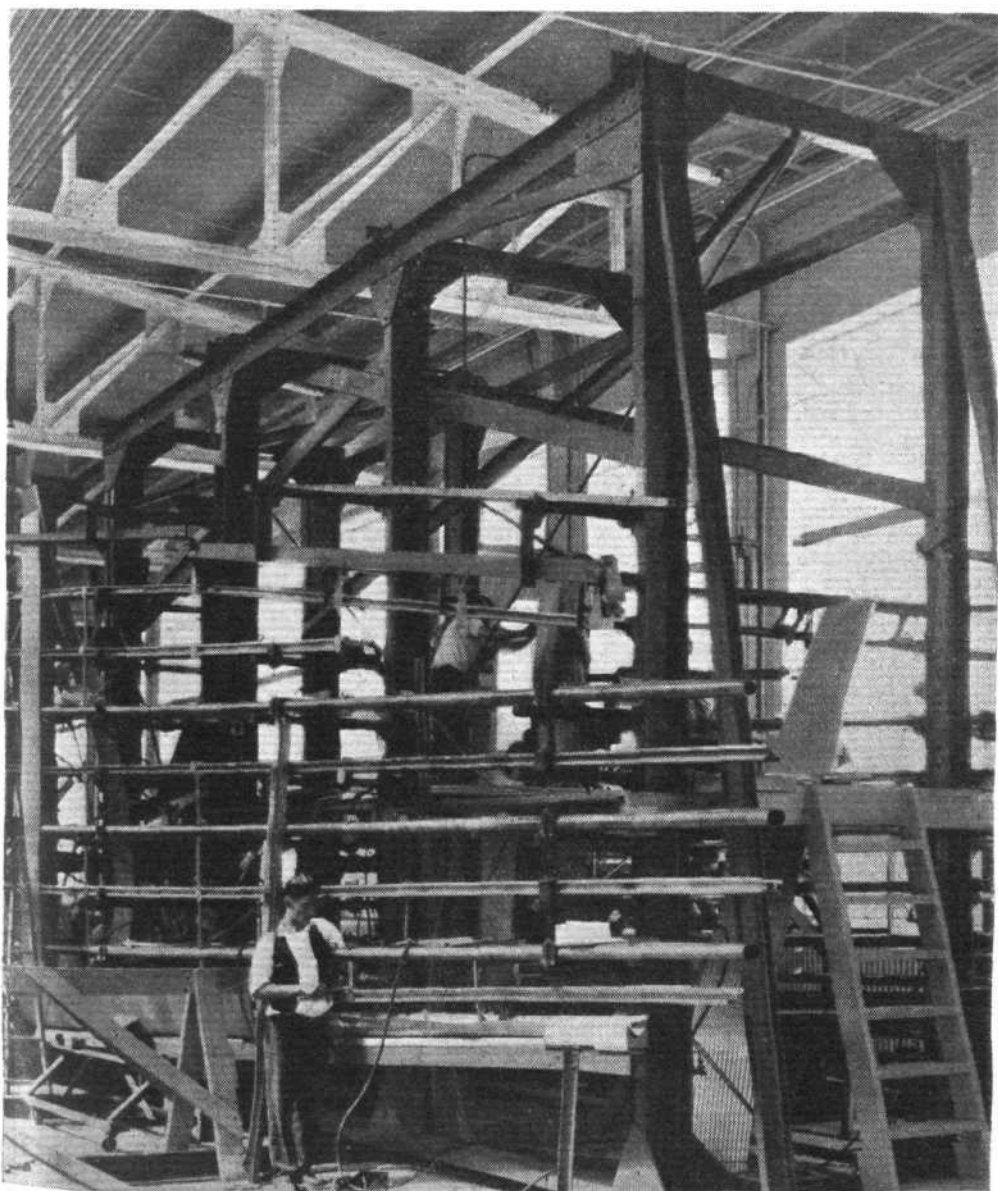
routes. The power expenditure per passenger is by no means excessive in the Ford machines, especially in view of the good performance, and both types should be reasonably economical to operate as regards running costs, while the

type of construction adopted is such that maintenance costs should be very low.

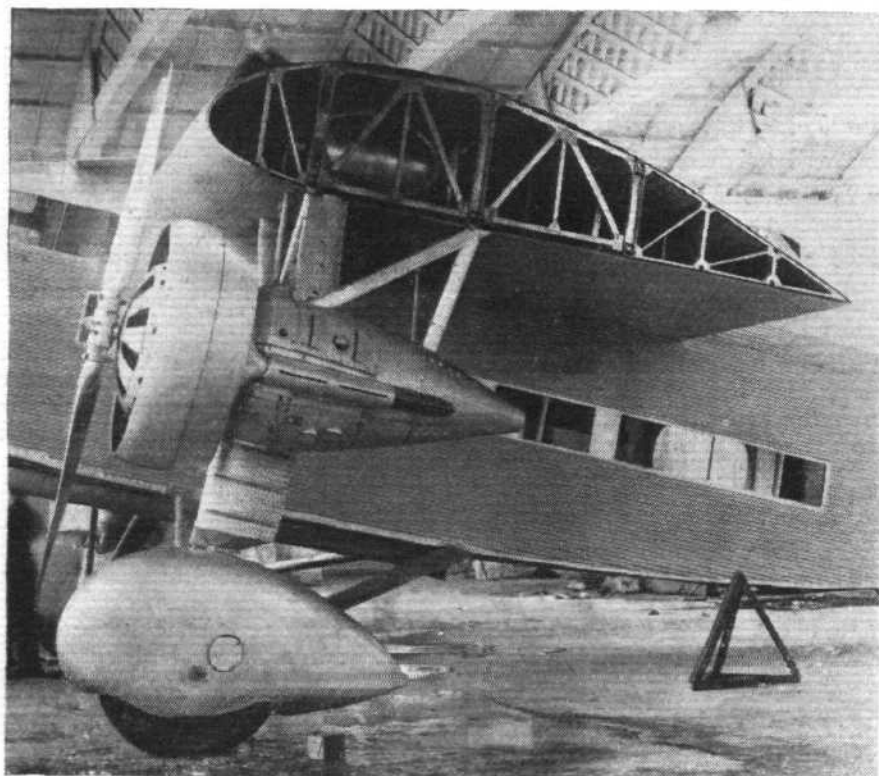
Structurally, the Ford monoplanes are truly all-metal, in that, in addition to the main structure, both the fuselage and wing are covered with metal. The fuselage skeleton consists of duralumin members, most of U section, to the flanges of which the metal skin is riveted. In the forward part these U section members are used for longerons as well as for vertical, horizontal and diagonal struts. Where two or more of these U section members have to be joined, this is done by simple fishplates and rivets.

It is, perhaps, the wing structure of the Ford machines which offers the greatest interest, since it is always instructive to see how different designers tackle similar problems. A metal wing of the full cantilever type, which carries the outboard engines, has to resist considerable stresses, some distributed and some concentrated. So to design a wing that nowhere does the strength fall below a certain figure, nor at others is unnecessary material carried is an impossibility. The best the designer can do is bound to be a compromise. In the Ford machines, use is made of three main spars, of which the middle one is situated approximately at the point where the depth of the aerofoil section is a maximum, the other two being placed ahead of and behind this. In between the main spars, there are lighter stringers of U section, but these serve only to stiffen the skin, those in the centre-section and end portions of the wing not being connected together.

The main spars are of duralumin, and have flanges of D section, built up from two strips. The top and bottom booms of the spars are joined by an N



**ASSEMBLING IN A VERTICAL JIG:** This photograph, taken in the Dearborn works of the Ford Company, gives a good idea of the elaborate jiggging used in wing assembly. The wings are erected leading edge downwards.



**THE TYPE 5-AT-C :** The wing ends were not yet in place when this photograph was taken at Hooton. Note the tank inside the centre section, and the cowling ring around the "Wasp" engine. On the right the castor-section tail wheel. (FLIGHT Photos.)

girder of plain trough section. Joining is by fishplates and riveting. The wing centre-section being of uniform profile, the spars in this are not tapered, but in the outer wing portions there is pronounced taper, and towards the wing tips, the depth of the N girders decreases to the point where the two D section flanges are joined directly together. Of wing ribs in the ordinary sense, there are none. Vertical and diagonal members, lying in a fore and aft plane, and short straight members roughly forming the wing contour, take the place of ribs, and the final aerofoil section is obtained by the metal covering of the wing. This covering is of "Alclad," a "sandwich" with sheet aluminium in the centre and a thin coating of aluminium on each side. The aluminium is, of course, subject to the effects of the air, and a thin film quickly forms, which acts as a protection for the duralumin underneath. It is said that if this thin film is scratched, the chemical action causes it to "heal," which is not, of course, the case with the anodic process surface.

At the outer ends of the centre-section main spars, and at the inner ends of the wing piece main spars, there are steel forgings of high-grade steel and fine quality workmanship which are riveted to the D section booms of the spars. These forgings terminate at their free ends in either plain or forked ends, and connection between the centre-section spar and wing end spar is by a horizontal bolt. Six bolts secure one wing end, and the assembly and dismantling of a wing-end is an amazingly quick process, as well as one calling for no skill. In fact, the tool most frequently used is a "Brummagem screwdriver."

#### FORD 3-ENGINE MONOPLANES

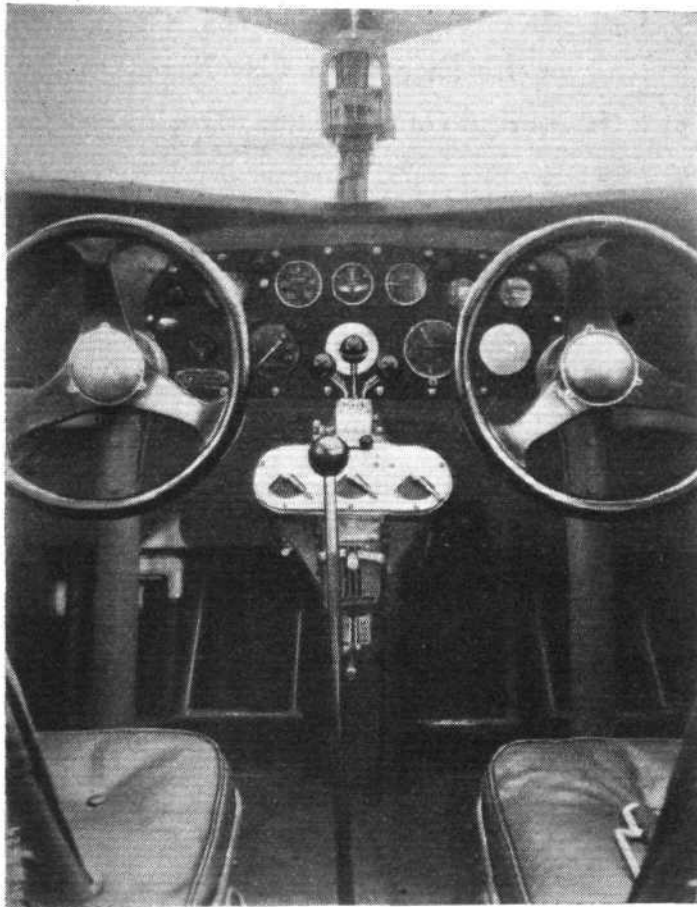
	Type 4-AT-E		Type 5-AT-C			
	<i>Power Plant</i>					
Engine type.. ..	3 " Whirlwind " J6		3 " Wasp "			
Total power .. ..	900 b.h.p.		1,260 b.h.p.			
	gallons.	litres	gallons	litres		
Standard fuel capacity ..	192	875	230	1,050		
Standard oil capacity ..	20	91	28	127		
	<i>Dimensions</i>					
	ft.	in.	metres	ft.	in.	metres
Length o.a. .. ..	49	10	15.2	50	3	15.3
Wing span .. ..	74	00	22.6	77	10	23.7
Height .. ..	11	9	3.6	12	00	3.7
Wheel track .. ..	16	9	5.1	18	7	5.7
Cabin length .. ..	16	3	4.9	18	9	5.7
Cabin width (average) ..	4	6	1.4	4	6	1.4
Cabin height (average) ..	6	0	1.8	6	0	1.8
Cabin volume .. ..	461 cu. ft. (12.9 m. <sup>3</sup> )		529 cu. ft. (14.8 m. <sup>3</sup> )			
	<i>Weights</i>					
	lb.	kg.	lb.	kg.		
Tare weight (fully equipped)	6,500	2,950	7,600	3,460		
Total disposable load ..	3,630	1,650	5,900	2,680		
Pay load .. ..	1,725	785	3,643	1,650		
Gross weight .. ..	10,130	4,600	13,500	6,140		
	<i>Accommodation</i>					
Number of seats (removable)	11		13 to 15			
Luggage space volume ..	30 cu. ft. (0.84 m. <sup>3</sup> ).		30 cu. ft. (0.84 m. <sup>3</sup> )			
	<i>Performance</i>					
	m.p.h.	km/h.	m.p.h.	km./h.		
Maximum speed .. ..	132	213	152	245		
Cruising speed (1,700 r.p.m.)	107	172	122	196		
Stalling speed .. ..	57	92	64	103		
	ft./min.	m./sec.	ft./min.	m./sec.		
Initial rate of climb.. ..	920	4.67	1,050	5.33		
	ft.	m.	ft.	m.		
Height in 10 min. ....	7,200	2,200	8,000	2,440		
Absolute ceiling .. ..	18,600	5,670	20,500	6,250		
Service ceiling .. ..	16,500	5,000	18,500	5,640		
Absolute ceiling (2 engines)	7,100	2,160	10,500	3,200		
Range (standard fuel capacity)	570 miles (918 km.)		560 miles (900 km.).			

The performance figures are guaranteed to within 2 per cent. If desired, the type 5-AT-C can be fitted with petrol tanks of 295 gallons (1350 litres) capacity. The range is then increased, and the pay load correspondingly decreased.



The engines are mounted very much as in British machines, one in the nose and two under the wing. The wing engines are carefully faired in, and the "Wasps" in the 5-AT-C have, in addition, a development of the N.A.C.A. cowlings, which looks not unlike a Townend ring, but which is, we are assured, really quite different. Drag is further reduced by enclosing the wheels, all but a small portion, in streamline casings. The wheels, by the way, are fitted with Lockheed hydraulic brakes. A tail wheel with castor action is fitted instead of a tailskid, and as the wheel brakes can be independently operated, the machines can be turned in a very small circle on the ground.

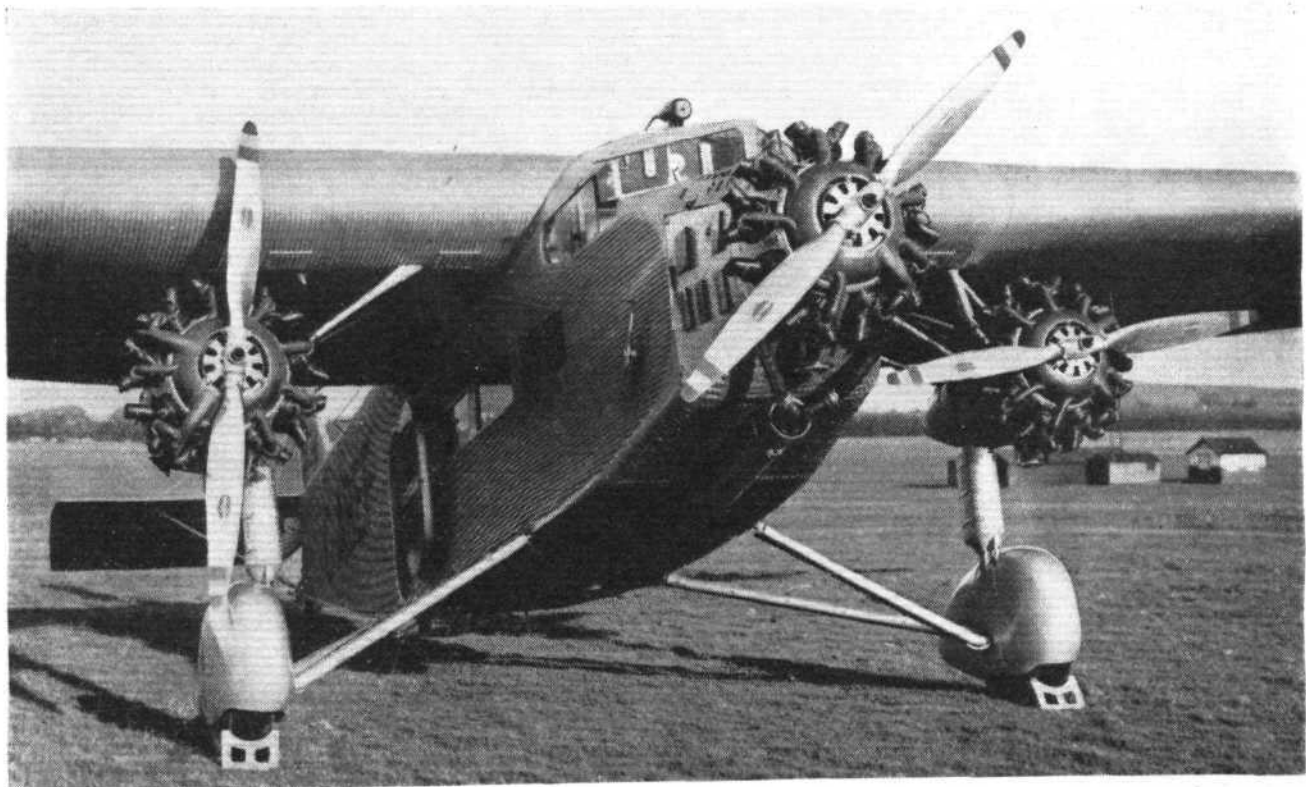
The passenger accommodation in the Fokker monoplanes is comfortable. There



is no leg room "thrown away," but the space could not be described as cramped. The seats, of the aluminium bucket type, are comfortable, the ventilation is good, and hot air can be admitted to the cabin through louvres in the floor, which draw warm air from a muff around the exhaust pipe of the central engine.

The pilot's cockpit ahead of the wing and cabin is protected by windows, and the view obtained is very good. Dual controls are provided, and the layout of the instrument board impresses one as being particularly good. Complete navigation equipment is carried, and the wing headlights proved their worth on the very first flight to London, when the machine landed in fog and darkness at Northolt.

THE COCKPIT OF A THREE-ENGINE FORD :  
The central lever operates the wheel brakes (hydraulic).



THE FORD 4-AT-E : Note the streamline fairings over the wheels. The propellers are standard metal airscrews, with adjustable pitch blades. Starting is by means of hand-operated inertia starters, one being carried in each nacelle and one in the fuselage. (FLIGHT Photo.)



# R 101 INQUIRY

## Leakage from Gas Bags

THE Inquiry into the loss of R 101 was continued on Wednesday, November 5. Flight-Lieut. Montgomery Moore, who had accompanied the preliminary inquiry as interpreter, said that he had made a search for oil dropped on the course of the ship but had found only two quite small patches. The man in charge of the landing ground at Poix had told him that the ship passed over at a height of 100 m. Sir John Simon remarked that if the ship was flying at 1,000 altimeter height that would be about right. The aerodrome at Poix was about 185 m. above sea level and was the highest point in the district. The ship would be closer to the ground than half her own length. Sqdn.-Ldr. Booth said that over country like that he would have expected her to go up.

Sir John Simon read from a letter by Col. Richmond dated January 22, 1930, "A 5,000,000 cu. ft. airship according to current British ideas (underlined) is not suitable to carry 100 passengers for journeys to the East at all times of the year." Air Marshal Sir John Higgins (late Air Member for Supply and Research) said that they had worked it out very closely on the information they had got from R 100 and R 101, and had concluded that with only one mooring tower between England and India they would have to have a gas capacity of something like 9,000,000 cu. ft. to have a safe margin of fuel at any time of the year. Sir John Higgins spoke of a conversation with Lord Thomson on July 1, when the latter said that if the modifications to R 100 were not satisfactory the flight to Canada could not be made, but nothing must delay the preparation of R 101 for the flight to India.

Sir John Simon asked again if a report on the gas bags subsequent to July 1 had been found, and was informed that it had been. He discussed with Sir John Higgins the omission of a 48 hours' trial flight. The latter said that when it was decided to lengthen the ship (which had then done a 31 hours' test), there was no point in granting a certificate of airworthiness to the ship in its old shape. He had been satisfied with the flight of 31 hours, and would have been satisfied with a satisfactory test of a reasonable length afterwards. It was then stated that Dr. Jones, of the National Physical Laboratory, had been anxious about the effect of the new bay on the stability of the ship. A letter from Dr. Jones, dated January 24, said, "I think the figures are satisfactory and that the stability sacrificed will not be serious. You will still be better off than R 100."

### Thursday, Nov. 6

Sir John Higgins stated that, despite the anxiety of the Secretary of State to get off, he was sure that if the Cardington officers had had any doubt about the ship they would have said so. Sir Walter Nicholson, Secretary of the Air Ministry, also testified that their attitude was one of complete confidence. Air Vice-Marshal Dowding, who succeeded Sir John Higgins as Air Member for Supply and Research, said that he had asked Sir John to give him a line on the characters of the men at Cardington, and had been told that their advice would be on the side of caution rather than of rashness. He said that when he visited Cardington the officers there were not quite happy about the gas bags in R 100, but his impression was that they were satisfied with those in R 101. The Air Vice-Marshal said that he had instructed Wing-Commander Colmore to carry out a high-speed trial soon after leaving Cardington on the flight to India, so that if anything went wrong the ship could return. He did not know why this instruction had not been carried out.

Sir John Simon asked if there had been only one trial flight, and it was impossible for that to be a full-speed test (because an oil cooler on one engine had failed) if the flying conditions were "very perfect" (quoting from Col. Richmond's diary) that was rather a limited basis upon which to found the first expedition ever made by an airship from Britain to India? The Air Vice-Marshal agreed, but he objected to the word "rush" being used, as it involved something not being done that ought to be done.

### Friday, Nov. 7

This day was mainly devoted to the question of leaks in the gas bags. Before the public sitting, the Court spent over an hour in a private room receiving instruction in the arrangement of gas bags and the operation of valves. Two French officials, who had joined in the enquiry on the spot, and had been sent over by the French Government, M. H. P. Jouglaire and M. H. Brunat, of the French aeronautical department, then gave evidence. They agreed with the

British officers that no breakage took place in the air, and that when the ship struck the ground the elevators were full up. Mr. J. W. Ward Dyer, fabric manager at Cardington, said that when the bags were taken out in December last they were really in good condition, despite some holes due to chafing.

Sir John Simon said that two documents had just come into his possession which had not been produced before, and the Court would require to know why. The Solicitor-General said the responsibility was his. The file had been put aside for copying and had been overlooked. One of the documents was a letter from Col. Richmond to Maj. Scott, dated July 2, in which the designer said that on a "pessimistic coefficient of discharge," the loss of lift would be about one ton per square inch of hole in 12 hours. He considered this result rather startling, and it emphasized the great importance of guarding against holes. It was conceivable that they might have had leaks in both ships amounting to four or five square inches area.

The other document was from Mr. F. M. McWade, in charge of the inspection department at Cardington, dated July 3, and addressed to the Air Ministry. The letter ran:—

(Confidential.)

H.M.A. R 101

### AIRWORTHINESS OF THE ABOVE SHIP

"On June 26, 1930, I handed over the permit to fly dated June 20, 1930, till July 19, 1930. Owing to the modifications which have recently been carried out in the wiring system the gas bags are now hard up against the main longitudinals and rubbing very hard on the nuts of the bolts positioning the stirrup into which the tie-rods are screwed. Further, the gas bags foul very badly the heads of the taper points at the joints of the main and intermediate struts at the centre ridge girder ends. This matter, in my opinion, has become very serious as the points of fouling occur throughout the ship and amount to thousands. Padding has been resorted to by wrapping fabric over the parts mentioned above, and this is the usually recognised method used in isolated cases. Padding to the extent now necessary is, in my opinion, very unsatisfactory, because the bags move when the ship is in flight, and the padding becomes loose, and the projection complained of is again exposed. Although the gas bags have recently been reconditioned, and were in good order when placed in the ship a few weeks ago, there are now many holes in them. Where the fabric is wrapped round a joint it may be difficult to know what is happening underneath the wrapping. I have in mind the corrosion question. The fabric will become damp and in many cases wet when the ship is in flight. Therefore, there will be alternative process of wetting and drying of the fabric which must be detrimental to the metal underneath. I am fully aware that to remedy the faults complained of is in the nature of a large undertaking, and it might be necessary to remove the bags from the ship. Until this matter is seriously taken in hand and remedied, I cannot recommend to you the extension of the present permit to fly or the issue of any further permit or certificate."

On receipt of this report, Col. Outram, Director of Aeronautical Inspection, had consulted with Wing Commander Colmore, who wrote back saying "As far as we can trace at present, there have been remarkably few nips in the gas bags of R 101, and the holes which have occurred are due to fouling girders. We have little doubt that padding will be a permanent remedy, and if this is accepted, then it is certainly not a large undertaking to put the matter right."

Col. Outram was then called. He said that he had not submitted Mr. McWade's report to the Air Member, because after he had consulted with Colmore he was satisfied and did not carry the matter further. He had been quite satisfied that padding had stopped the making of big holes.

Mr. McWade, in charge of the inspection department at Cardington, said that he had had 27 years' experience of airships. He did not "inspect" the ship at the tower head on October 1. The ship had already been passed by his assistant, but it was natural that he should see as far as he could that everything was right. He wrote the letter referred to above for the D.A.I., as he regarded the matter as serious. He said that the ship when she started had thousands of points of padding, which had been rather overdone on the off chance of points touching. He did not think that padding was a satisfactory method of curing the chafing. Had it been left to him, the airship would not have received a certificate of airworthiness.



Monday, November 10

Evidence of the Captain of R 100

The Court received further evidence of inspection routine from Col. Outram and Mr. McWade. Sir John Simon remarked that the inspection chits were in admirable order. Col. Moore-Brabazon called Mr. McWade's attention to a report in a rigger's log that while the ship was at the tower in a storm, she rolled 6½ degrees, and the valve of No. 8 gas bag was found to be opening as she rolled. He asked if other valves would open. Mr. McWade thought it was likely, but did not know if it happened.

Mr. G. R. Raisbeck, an examiner of the inspection department, who was on the trial flight on October 1, said that he had arranged with Flight-Lieut. Irwin to watch for any sign of leakage in the valves. He had reported that everything was satisfactory. The captain had agreed.

Capt. Meager, 1st officer of R 100, who was on R 101 on the Hendon Display flight, said that the ship was heavy. When he took watch he dropped half a ton of ballast to correct this. Later, he reported this to Flight-Lieut. Irwin, who put it down to valves chattering. When approaching the tower they had to drop eight tons of ballast. The ship had had a tendency to dip 5 to 7 degrees. The coxswain was raising the elevator 15 to 20 degrees to counteract this, and remarked: "It is about as much as I can do to keep her up."

Flight-Lieut. S. Nixon, Assistant Director of Airship Development, said that before the start Major Scott said he was going to get all the passengers on board early, as he wished to get away before 7 p.m., as the barometer was falling. He said with emphasis that Colmore was definitely not a man who would take any risk if the ship was not fit to start. He would have absolutely refused. He had known Colmore very intimately for 15 years, and his opinion was based on a number of incidents as well as on a general impression.

Squadron-Leader R. S. Booth, captain of R 100, corrected a previous statement about the altimeter. He said it was set at 200 ft. above sea level. On the flight the day before the Hendon Display, he noticed the heaviness and spoke

of it to Irwin, who seemed to think the valves were leaking, due to slackness in the cover. When the new bay was put in, Irwin said to him that he hoped the ship would have 36 to 48 hours' flight at cruising speed in bad weather to test out the ship. Sqdn.-Ldr. Booth explained that a long flight was useful, to see if any defects might occur after a long flight. On the 50 hours' flight with R 100 defects had occurred after 45 hours which would have hampered them seriously if they had occurred in the middle of the Atlantic. The Court then said they must put this question to him; Did he think that the trial of the modified R 101 was adequate? The captain of R 100 replied:—

"I think the officers concerned, with more experience of that ship than I have, and Major Scott, with more experience of airships generally, were quite satisfied with the ship, and were confident in her and in her crew. At the same time, I feel that their agreement to leave was biased by the fact of the Imperial Conference, and because it was the psychological moment for the airship to carry the Secretary of State to India and back—this biased their judgment in agreeing to fly. If the Imperial Conference had not been on I feel confident they would have insisted on more trials, as was done in the case of R 100 before she went to Canada."

Reverting to the flight on the day of the Hendon rehearsal, Sqdn.-Ldr. Booth said that the rate and degree at which gas was lost were quite abnormal. In the conditions in which she was flying on those two days at Hendon it would have been impossible for her to get to India. Prof. Inglis asked what would have happened if they had persevered? The reply was that she had plenty of ballast, and they would not have continued on an endurance flight of 50 hours in those conditions. There was certainly a leakage of gas. He considered that something sudden must have happened, as a gradual loss of gas would have been realised by the skilful officers on board before it reached any extreme or dangerous degree.

Sir John Simon adjourned the Court until December 3. He requested Sqdn.-Ldr. Booth and other experts to consider how many possible causes there were to explain the course of events. The next stage of the inquiry would be to try to find the probable cause of the accident.

PENSIONS AND GRATUITIES TO R 101 DEPENDENTS

THE full particulars of the pensions, etc., awarded to dependents of the R 101 victims, referred to in the general statement below, are as follows:—

R.A.F. PERSONNEL

In respect of the officers, the awards are:—

	Widow's Pension.	Widow's Gratuity.	Children's Allowances.
Wing-Cndr. Colmore .. ..	£180	£450	48 per annum (two children)
Sqdn.-Ldr. Rope .. ..	140	300	None.
Sqdn.-Ldr. O'Neill .. ..	140	300	48 per annum (two children)
Flt.-Lt. Irwin .. ..	100	200	None.
Flying Officer Steff .. ..	90	150	24 per annum (one child).

In the case of Flt.-Sgt. Potter a widow's pension of 22s. a week is conferred, without gratuity. There is an allowance of 5s. a week for one child. The Australian Government are dealing with the case of the Australian officer, Sqdn.-Ldr. Palstra.

CIVILIAN PERSONNEL

Awards of compensation and allowances under the Treasury Warrant are given below. The allowances to widows cease on re-marriage; children's allowances continue to the age of 18.

NOT UNDER COMPENSATION ACT

	Widow. Annual Allowance.	Gratuity.	Children. Number.	Annual Allowance to Each.
Atherstone, N. C. ..	£191	—	2	£31
Bishop, P. ..	257	1,038 (a)	1	42
Branker, Sir W. Sefton, K.C.B., A.F.C. ..	300	—	—	—
Bushfield, A. ..	100	366	—	—
Gent, W. R. ..	97	—	1	16
Giblett, M. A. ..	213	— (b)	1	35
Hunt, G. W. ..	97	—	2	16
Johnston, E. L. ..	204	—	1	34
Keeley, S. T. ..	95	—	2	15

Richmond, V. C. ..	300	—	—
Scott, C. N. ..	300	—	(including awards to children).

(a) Payable to legal personal representative.

(b) £3,981 due under policies held under the Federated Superannuation Scheme for Universities.

UNDER COMPENSATION ACT WITH SUPPLEMENTARY AWARDS WIDOWS AND CHILDREN.

	Compensation Award (Lump Sum).	Treasury Warrant Allowance.	Other Dependents.
Atkins, G. K. ..	£529	No widow	Undecided.
Blake, R. ..	£300	£55	—
Burton, G. A. ..	£300	£55	—
Church, S. ..	—	No widow	£100
Elliott, F. ..	—	No widow	£150
Fergusson, C. J. ..	£300	Undecided	—
Ford, H. E. ..	£484	Undecided	—
Foster, P. A. ..	£569	£56	—
Graham, E. A. ..	—	No widow	Undecided.
Hasting, A. C. ..	—	No widow	No dependents.
Hodnett, W. F. ..	—	No widow	No dependents.
Key, T. A. A. ..	£300	£60	—
King, W. H. ..	—	No widow	£125
Littlekit, M. F. ..	—	No widow	£125
Mason, N. C. ..	£600	£67	—
Meggison, T. W. ..	—	No widow	Undecided.
Moule, W. ..	£300	£56	—
Norcott, A. W. ..	—	No widow	£100
Oughton, L. F. ..	£456	£62	—
Radcliffe, W. G. ..	£600	£55	—
Rampton, M. G. ..	—	No widow	£270
Richardson, A. J. ..	£456	£55	—
Rüdd, E. G. ..	£300	£56	—
Savidge, A. H. ..	£432	£60	—
Scott, S. E. ..	£302	£70	—
Short, G. W. ..	£504	£60	—
Taylor, C. ..	£600	£67	—
Watkins, A. H. ..	—	No widow	Undecided.

MR. MONTAGUE, Under-Secretary for Air, on November 7, replying to Sir S. Hoare, who asked whether he would state the amount of pensions or gratuity to which each of the dependents of the victims of R 101 was entitled, said:—With the permission of the right hon. and gallant baronet, as the table for which he asks is a long one, I would propose to indicate the awards in a few typical cases and circulate full information in the Official Report as to the awards already completed. (The detailed particulars of the pensions, etc., are set out above.—ed.) Excluding the late Secretary of State and his personal servant, the personnel on board R 101 fell into three classes for the purposes of these awards:—(1) Serving officers and men of the Royal Air Force. (2) Civilians who were not workmen within the meaning of the Workmen's Compensation Act. (3) Civilians who were workmen within the meaning of the Workmen's Compensation Act.

The awards to the dependents of Royal Air Force personnel are determined by the King's Regulations and Air Council Instructions. Under these, the widow of a wing commander receives a yearly pension of £180, a gratuity of £450, and a compassionate allowance for each child of £24 a year. The widow of a flying officer receives £90 a year and a gratuity of £150, with an allowance of £24 a year for each child. In addition, an education allowance not exceeding £35 a year may also be awarded, subject to certain conditions as to pecuniary need, etc., to children over the age of eight. This normally ceases at the age of 18. The widow of a flight sergeant receives 22s. a week, plus an allowance of 5s. a week for each child. The child's allowance normally ceases at the age of 16, and the widow's pension is then reduced to 15s. a week until she reaches the age of 40, when it is increased to 22s. a week when she reaches the age of 60 it is again raised to 24s. 6d. a week.

Awards to the widows and children of the civilians coming under category (2) are made under the Treasury Warrant of January 17, 1919. The pension or annual allowance awardable to the widow under this Warrant is one-quarter of the annual salary of her late husband. The children under 18 years of age are eligible for allowances, which are payable up to that age, but the widow's pension may not exceed £300 a year nor may the widow's pension and the children's allowances taken together exceed that amount. The awards to this class vary between a pension of £95 7s. 6d., plus a children's allowance of £15 17s. 11d. for each of two children, to a pension of £300 a year. Two of the widows were entitled to a gratuity on their husband's death and no reduction has been made in the amount payable under the Warrant on this account, and, similarly, the full rate permissible under the Warrant has been paid to the widow of a scientific officer, who will also receive an insurance payment under the Federated Superannuation Scheme for

Universities, in respect of which deductions were made from her husband's salary during his lifetime.

The dependents of civilians coming under category (3) are being awarded the compensation to which they are entitled under the Workmen's Compensation Act. Where these awards are of less value than those which might be given under the Treasury Warrant already referred to, supplementary awards are being made to make up the difference.

Sir S. Hoare asked whether he was to understand that there was no marked discrepancy in the payments, whether gratuity or pension, between the dependents of the civilian victims and of the Service victims.

Mr. Montague: There is no marked discrepancy. In the case of those who come under the Workmen's Compensation Act, they are all being brought under the Royal Warrant or the equivalent to that.

#### Lord Thomson's Estate

THE Right Hon. Christopher Birdwood, Lord Thomson, C.B.E., D.S.O., has left £1,737, with net personalty £1,646. The will, dated October 3, 1930, made on a sheet of Air Ministry paper, reads:—"In the event of my death during the flight of R. 101 to and from India, or as result thereof, I bequeath everything of which I die possessed—cash, shares, chattels, and papers—to my brother, Colonel Roger Gordon Thomson, C.M.G., D.S.O., of Springhill, Widdington, near Newport, Essex."

#### R 101 Memorial Fund

THE Lord Lieutenant of Bedfordshire and the Mayor of Bedford have issued an appeal for funds for a memorial to those who lost their lives in R 101. The memorial in the country churchyard at Cardington cannot be elaborate, but it is hoped to erect a suitable one, and also to be able to make some provision for the education of children of the victims, etc. Donations should be sent to the Mayor of Bedford, at the Town Hall, Bedford, marked "R 101." They will be acknowledged in the public press.



**AUTOGIROS OVER NEW YORK:** Two Pitcairn Autogiros recently carried out some flights over New York City to determine the effect of wind currents among the "skyscrapers," and to find possible landing-places. Our picture shows the two machines flying up the river from New York Harbour.



# PRIVATE FLYING AND CLUB NEWS

**ANOTHER Moth Innovation.**—The following is a copy of the letter which de Havillands are sending to all Light Aeroplane Clubs:—

"While the extension and development of the Flying Club movement is of the utmost importance to the aircraft industry, we believe it to be a fact that the activities of many Flying clubs are curtailed by the lack of capital resources to provide adequate equipment. We frequently hear the sentiment 'We could very well do with another machine, but we cannot afford to buy one.'

On consideration of the circumstances it seems to us that provision of adequate and widespread tuition facilities is likely to be the 'bottleneck' in the development of private flying.

We have devoted considerable close study to the position with a view to finding a solution of the difficulties involved. Acting on our findings, we have decided to try the experiment of hiring out Moths to such clubs as would care to avail themselves of the facilities which we offer. An initial fleet of Gipsy Moths will therefore be made available immediately for this purpose. This fleet will be composed of brand new and unused Gipsy I Moths with wooden fuselages, and will be equipped with telephones, automatic slots and a compass. The machines will be fully insured by us against all ground and air risks, including third-party risks, and will be available for hire at the following rates:

For any period of hire up to six months, £60 per month.

For any period beyond six months (providing there has been no break in the hire), £50 per month.

All fees will be payable monthly in advance.

Delivery (with empty tanks) must be taken at Stag Lane Aerodrome, to which machines must be returned at the expiration of the period of hire.

Machines must be maintained at the expense of the hirer in a correct airworthy condition, and must be operated in strict accordance with the provisions of the Air Navigation Acts.

In the event of the occurrence of accidents causing damage to the aircraft, the first £20 of the cost of repair must be met by the hirer. In cases where damaged machines have to be

returned to this factory for reconditioning, the hire fee will be suspended until the machine is again in airworthy condition.

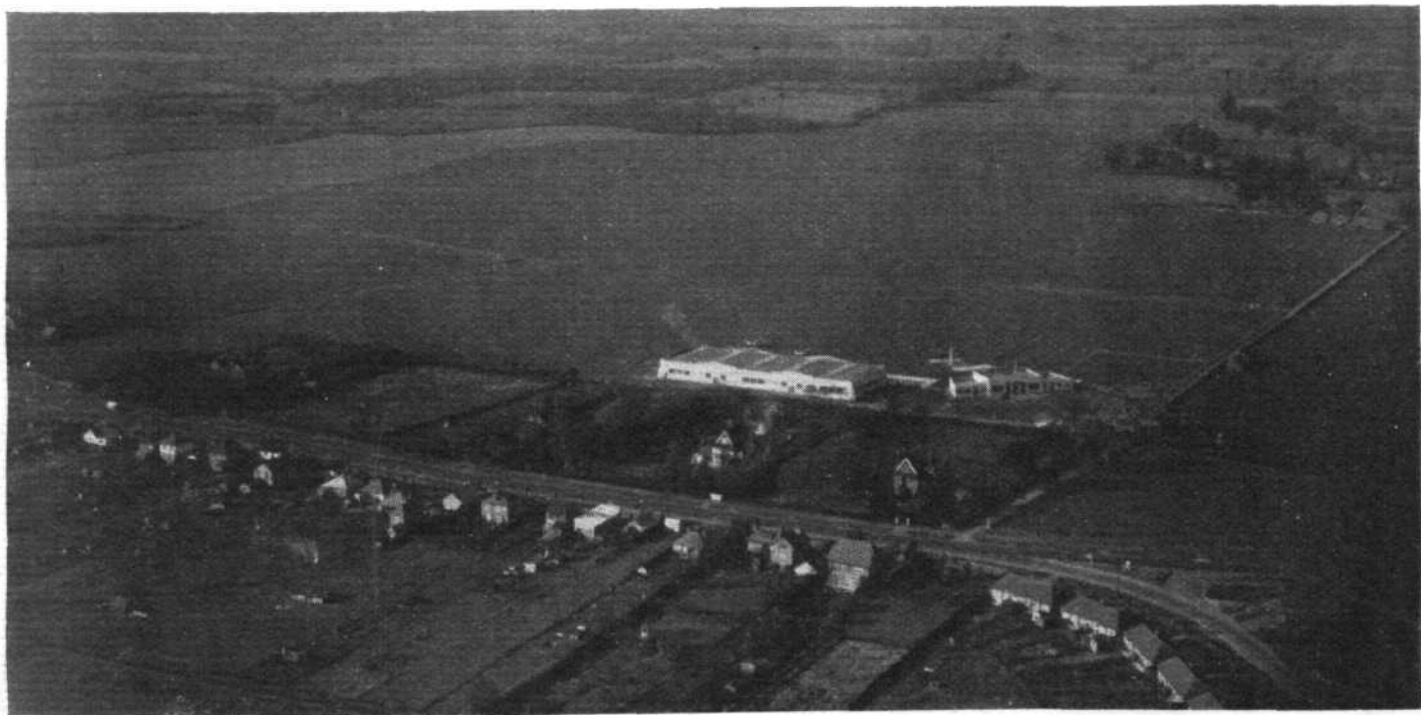
When the Certificate of Airworthiness expires, machines must be returned to us for renewal. If available, another machine will be supplied in its stead.

The financial advantages of this scheme are many; clubs will be saved the necessity of the substantial capital outlay involved in the acquisition of their own equipment; they avoid the lump sum payment of the annual insurance premium and also of the annual overhaul with its attendant delay and expense. It is expected that this scheme will be welcomed by new clubs in districts in which local support is not yet assured, where it will be advantageous to experiment with the temporary use of a machine in order to experience what support is forthcoming and to gauge the probable success of the enterprise.

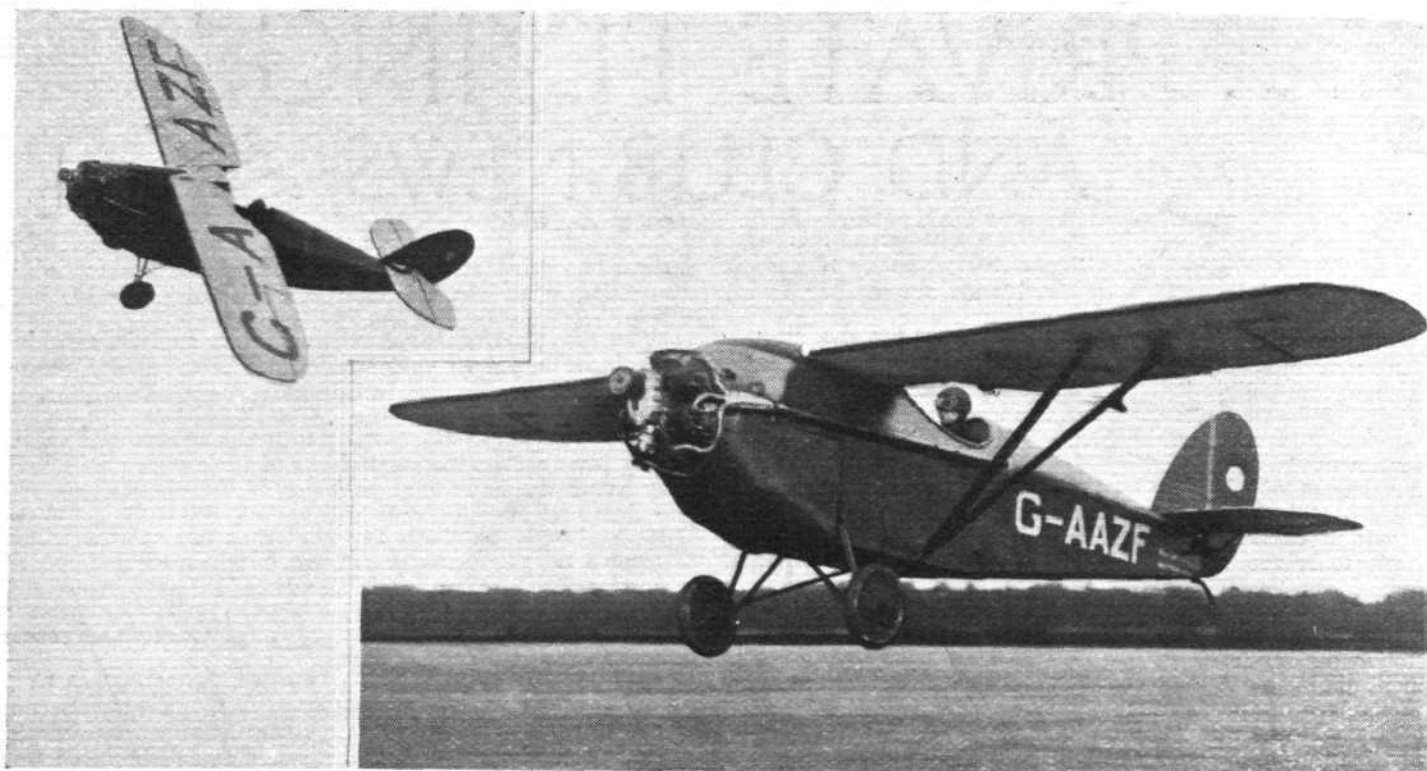
It will also, we feel, appeal to old-established clubs in cases where their own permanent aircraft may become damaged by accident necessitating their being out of action for some time. In such cases a machine can be hired temporarily as a replacement in order not to arrest flying operations."

**NORTHANTS Aero Club Dance.**—One of the jolliest dances ever held in Northampton, and certainly the most successful arranged by the Aero Club, was held on Friday, November 7, at the Salon, Northampton. About 350 people danced, and it speaks well for the organisers that there was no overcrowding anywhere.

There has been much talk for some time about a Dress Reform for men, and the Flying Committee decided it was about time they took the matter in hand and *did* something. Therefore, about 20 of the really adventurous members of the Aero Club wore original costumes. They wore black shirts [boiled or soft—Ed.], white bow-ties, white links and studs, black dress-trousers, and broad white scarves round their waists. Of course, much criticism was aroused, a good deal of it adverse. Possibly some of the men, whose wives had forced them to wear the usual uncomfortable



A view of the new aerodrome at Hatfield which now accommodates the D.H. flying school,  
(FLIGHT Photo.)



**A COMPER SWIFT (POBJOY):** Being demonstrated by Flt. Lt. N. Comper, with engine the Swift has a performance like a small fighter. (FLIGHT Photos.)

garb, were jealous of the comfort and freedom enjoyed by their happier brethren!

Sywell is certainly lucky, for whatever is happening, visitors always come to the club to join in and help with the fun.

On Friday afternoon, Messrs. Bentley and Watson flew from Heston in the Puss-Moth, Messrs. Brett and Carrick flew over from Norwich, and Mr. and Mrs. Cubitt motored from Norfolk. While, Mr. Rhodes, of the B.P., hearing at 4 p.m. that there was an Aero Club Dance at Northampton at night, left London with his wife at 7 p.m., and arrived at the Dance about 9.30.

On Sunday, November 9, the new President of the Club, Mr. W. Sears, of Weston Favell, had his first flight.

The previous Sunday a large crowd gathered at the aerodrome in spite of very threatening weather, hoping to see Mr. John Trantum make another parachute descent. Unfortunately, the ground was very wet (two hailstorms and a thunderstorm having done their worst during the morning), and as Mr. Trantum was preparing to make his 20,000-ft. drop, weather permitting, during the next few days, he did not want to risk soaking his parachute. Mr. Newton has resigned the Chairmanship of the Club, a position he has held since the beginning of things in September, 1928. He has also resigned the editorship of the "Sywell Windstocking," the club magazine. He has done much for the club in very many ways, and all members much regret that he has had to send in two resignations at the same time.

Mr. Geoffrey Linnell is the new chairman, and Captain Addis is going to edit the "Windstocking."

With regard to our visitors, it is wonderful how good these fellows are. They fly miles to help any of our shows, so we, naturally, do our best to give them a jolly time while they are with us.

[You do!—ED.]

**MISS SPOONER**, as recently announced, is hiring her Moth ("Gipsy") to approved pilots at £2 per hour, or £4 per day, plus insurance. She is also undertaking taxi work with her three-seater Desoutter cabin monoplane, at home and abroad, at 1s. 6d. per mile—special quotations being given for long-distance flights.

Miss Spooner, by the way, is making great use of her new Desoutter ("Gipsy III"). During the week-end she went down to Hamble, and, like many others, was disappointed in the non-arrival of the Do-X. Her machine is one of the most beautifully fitted up Desoutters we have seen, and the dark blue upholstery goes exceptionally well with the dark blue exterior of the fuselage. There is no doubt that Mr. Desoutter has thoroughly realised the necessity for finishing his machine in a manner comparable to

the best saloon motor cars, and Miss Spooner's machine is a fine testimony of the success he has achieved in carrying out this policy. It is all the more regrettable therefore that he has found it impossible to carry on business and is therefore closing his works for a time. We sincerely hope that he will find the means to open up again before very long. At the moment he supplies the only genuine three-seater cabin machine on the English market, and it would be a tragedy if his pioneer effort in this class of machine was not successful.

**ANOTHER** Flight to The Cape.—Miss Reynolds, who has recently learnt to fly at the Surrey Aero Club, Gatwick, is planning an ambitious flight to the Cape via the West Coast route. She is having a Blue Bird "Gipsy III" on floats built by the Blackburn Company at Brough, and will be accompanied by Mr. G. T. Waters. Mr. Waters, who is responsible for the energetic beginning of this club, was one of the pupils of the late Col. G. L. P. Henderson, and as soon as he had obtained his "B" licence he started operating aircraft at Penshurst. Latterly, however, he has transferred his company to Gatwick and also formed the club.

**NATIONAL** Flying Services, Ltd., are offering reduced prices to clubs and private owners who require any work done on their machines during the winter months.

The workshops at Hanworth have been steadily developed until, of recent months, some 50 men have been employed, and a constant output of over 40 repair and overhaul jobs a month has been maintained. In order to keep the staff and plant occupied during the winter, when the company's own requirements decline, outside work is being undertaken at reduced rates.

The equipment of the Hanworth shops is unusually comprehensive, and every class of repair and overhaul is catered for. Plant has been installed for woodworking, welding, forging, sheet-metal work, fabric work, doping, painting, and engine testing. Moreover, there is a resident A.I.D. Inspector.

Annual overhauls for Certificate of Airworthiness are particularly well done. As more than 50 N.F.S. machines are dealt with, the work has been organised into a standard routine process which ensures 100 per cent. airworthiness and cleanliness in every part down to the smallest detail.

The reconditioning of engines can be entrusted to Hanworth with every confidence that it is in good hands, and that the engine will be given a proper test run before being passed out. The plant includes an engine-test house, equipped with a Heenan & Froude dynamometer, which, incidentally, is available on contract for engine tests up to 250 h.p. Apparatus for testing petrol tanks, magnetos and plugs is



also available, and a complete range of Cirrus spares is always in stock. A Black & Decker outfit and paraffin tank are used for engine cleaning.

Private owners who are anxious to ascertain the exact weight of their machines are aware of the rarity of weighing machines. Hanworth is one of the few aerodromes where a proper aeroplane weighing machine is available, and it can be used on payment of a small fee."

Everyone will be interested to hear that National Flying Services are now in process of reconstruction and that the Board of Directors has been newly constituted. These now are Mr. J. G. Peel, Chairman, Mr. C. R. Anson, Vice-Chairman, Mr. W. S. Stephenson, Col. The Master of Sempill, and Sir A. J. Cobham. Mr. G. E. F. Boyes now becomes General Manager, and it is understood that Sqd.-Ldr. F. E. Guest and Col. Ivo Edwards have severed their connection with the company. We trust that this new arrangement will result in the building up of a solid business and the subsequent presentation of a satisfactory balance-sheet at the end of next year.

**CINQUE Ports Flying Club.**—Flying time for week ending November 8, 20 hr. 50 min. In spite of the tremendous gale of wind on Sunday, November 2, which was recorded at 70 m.p.h. on the wind gauge at Lympe, both Mr. Brown and Mr. Waller managed to put in some flying during the comparatively quiet intervals, but Monday was rough all day, and no flying took place, so that the total for

the week is quite respectable. The continued activity of the "A" licence pilots during the bad weather is very encouraging, and shows increasing keenness.

Mr. C. J. Donovan, of Barking, Essex, who joined the club on October 9, was sent solo on Saturday, November 8, and did well, which is very quick work, as the club was shut during ten days in October, so that Mr. Donovan had only sixteen days of indifferent weather on which it was possible for him to fly.

**BROOKLANDS Aero Club.**—Rapid strides have been made since the formation of the club last May, membership now approaching the 200 mark. The various flying members have between them contributed some 200 hr. flying on the club's Moth, GAASZ, and during this time the machine has not even suffered a damaged undercarriage. The majority of flying members are ex-pupils of the Brooklands School of Flying, and such careful use of the aeroplane speaks well for their training.

Private owners and commercial pilots are always welcome at Brooklands, where they may land without any expense in the way of landing fees. Brooklands is now licensed as a private aerodrome, and all visitors should report to the control office and make themselves acquainted with the aerodrome regulations. The circuit direction should be observed, and this is indicated by a coloured flag up against the club-house—red for left-hand and white for right-hand circuits.

## GLIDING

**RUGBY Gliding Club.**—This recently-formed club got in some further gliding at Cotes Hill, Husbands Bosworth, on November 4, a large crowd of spectators being present. In spite of a somewhat gusty wind, several members were able to make satisfactory flights on the Reynard trainer from Leicester.

**DURBAN'S Glider.**—South Africa's first glider, *Miss Durban* which we illustrated in our issue of October 31, has made several successful flights at Durban North—one of which being about 400 yards—with its owner, Mr. Robertson, at the helm. Mr. Robertson, it is reported, intends building another glider with an enclosed fuselage.

**DORSET Gliding Club.**—Maiden Newton will be the venue of Dorset Gliding Club meetings for the next few weeks. The visit to Weymouth is postponed because the club is anxious to gain a larger number of "A" pilots' certificates than any other organisation before December 31, and thus win a valuable prize offered.

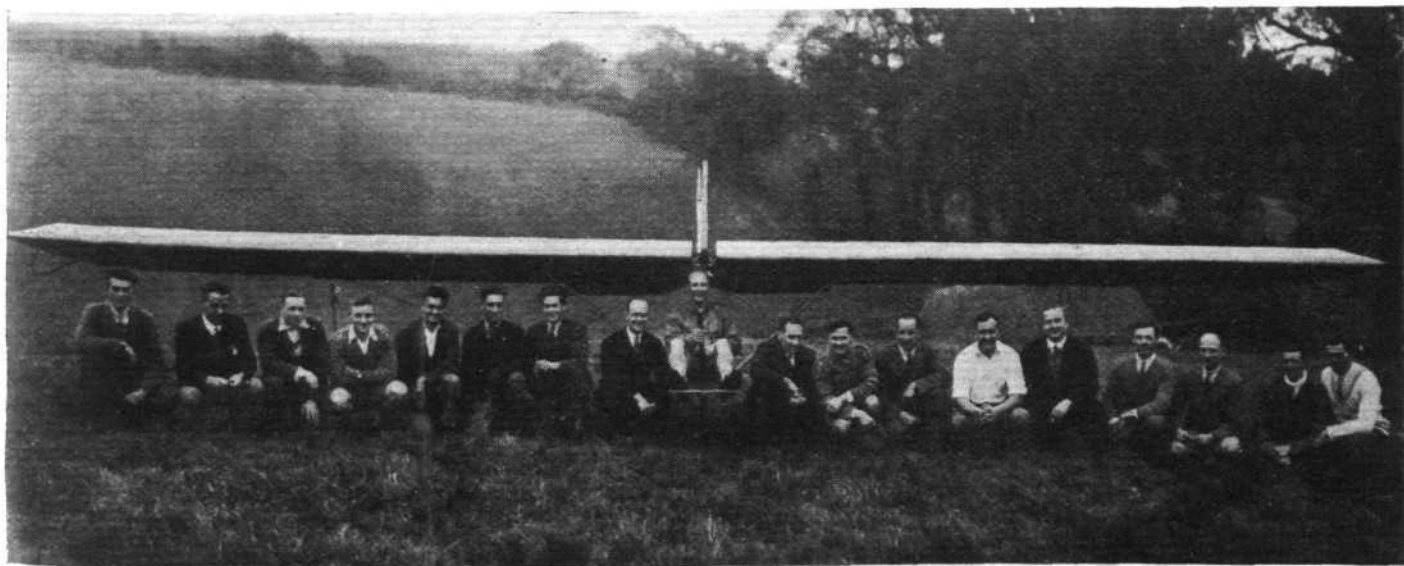
The flying ground at Chickerell, ideal for preliminary

training, offers no facilities for the 30-second flights which must be made by aspiring "A" pilots.

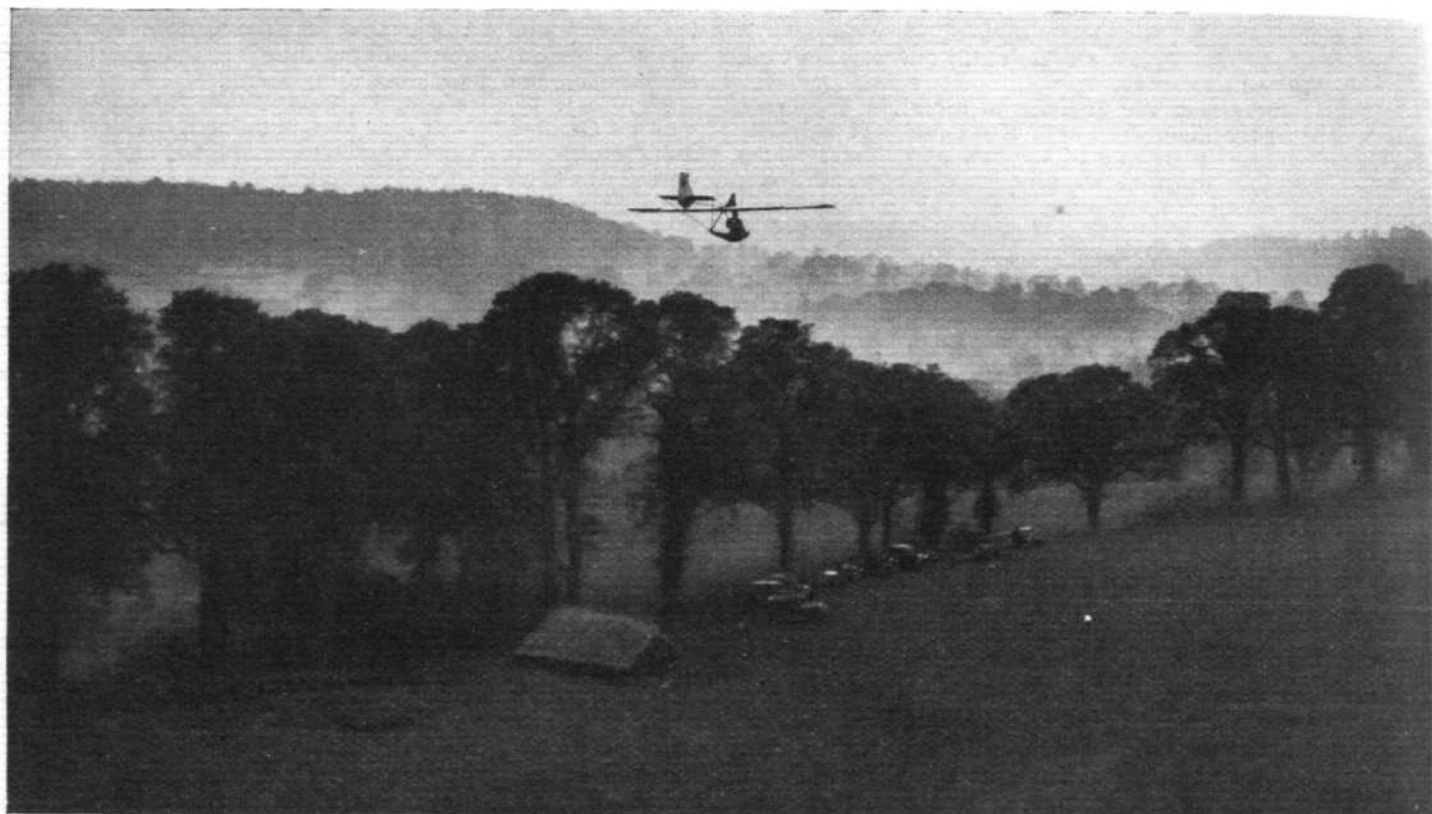
The number of "launches" made on "Freddie," the club's machine, now amounts to 409, and the ability of members to handle the glider has markedly increased. Regular attendance at meetings has resulted in some 20 members becoming really skilled. The sojourn of the glider at Westland Aerodrome, Yeovil, has marked a new epoch in the support the club has received, and it is significant to note the total mileage travelled by members to attend a single meeting has been as high as 300.

Here is an example of members' zeal. At a recent meeting an "ab initio" stalled the machine from an altitude of 20 ft., coming down in a half spin and breaking an aileron. At the stroke of eight next morning (Sunday) repairs were started by a hard-working band who had the machine airworthy for the meeting that afternoon. It is felt that the same spirit will be stimulated by the forthcoming Weymouth programme.

Have members any spare photographs of the Kronfeld display at Askerswell in July? Herr Kronfeld is anxious to



**A GATHERING AT CHILWORTH OF THE SURREY GLIDING CLUB:** From left to right, J. Brown, S. Humphries, E. Brame, R. Etchells, E. Shepherd, L. E. Hatcher, F. H. Robertson, P. W. L. Williams, Capt. Stratton (Hon Instructor), R. F. Dagnall (Chairman), A. H. Reffell, G. H. Hurst, M. H. Thomson (Hon. Treasurer), A. C. Oliver-Warren, F. Pilling, J. H. Leyland, C. Palmer, and G. H. Taylor (Hon Secretary). (FLIGHT Photo.)



The Surrey Gliding Club's training glider being piloted in a very able manner by their instructor, Capt. Stratton. (FLIGHT Photo.)

get together a pictorial record of his demonstrations in England and the hon. secretary of the club has been asked to send him any available from this area.

A film of the club's demonstrations at Askerswell and Cherhill has now been completed.

Owing to pressure of other work, Mr. E. H. Campbell Johnston has been unable to continue as hon. secretary of the club, and his place has been taken (*pro tem*) by Mr. J. Laver, 9, Commercial Road, Weymouth, to whom all inquiries should be addressed.

**SCARBOROUGH'S** Certificates.—Certificates have been gained by the following members of the Scarborough Gliding Club: Mr. J. C. Barnes (A and B), Mr. F. N. Slingsby (A), Mr. S. C. Howard (A), Mr. F. L. Gardiner (A), Mr. Barnes is the first gliding enthusiast in Yorkshire to obtain a B certificate.

**ISLE of Wight Gliding Club.**—Saturday afternoon, November 8, members met at Somerton Aerodrome, Cowes. The weather was mild and there was no "lift" in the air, so that members learnt something new by this. Theory tuition was given. Amongst the visitors were several well-known people. These were Mr. Guinness (the great sportsman), Mr. John Lord, of Saunders-Roe, and Capt. Balfour, M.P. The latter was invited to try his hand in the glider, which he did with very good style, making two smooth glides, showing he was no novice. They all gave a helping hand with the launching. Sunday they had some good sport, a nice steady wind to begin with. Mr. Lord and Capt. Allison (pilot to Mr. Guinness) and others assisted with the launching by means of towing with their cars. After about four tests we abandoned this method, as it was found it would not be suitable at this stage for the members. School work continued, all members that were present taking their turn. Mr. Guinness was present again and shows great interest in the gliding. Capt. Allison was invited to take a couple of glides, which he did in excellent style with fine landings. Major Brannon, M.C., Messrs. Richards, Thompson, Stagg, Hirst, Gray, Hackshaw, Clayton, all progressing favourably. The day ended a little earlier than could be wished, owing to a "stalled" heavy landing by Mr. Gray, damaging the keel and front cabane, which will be repaired for next week-end meeting.

The dual-control glider now being re-conditioned is gradually coming nearer to completion, and it is hoped soon to be taking more advanced work.

**GLASGOW** Gliding Club's first machine arrived in Glasgow on October 29, and was immediately assembled in the showrooms of Cameron & Campbell, Ltd., 161, North

Street, where it was on view for several days. The members ship of the club has now reached over 100.

**LINCOLN** Gliding Club.—A machine, fully tested and air-worthy, will be available for the use of members almost immediately, and a gliding ground has been obtained at Boothby Graffoe.

**NEWCASTLE** now has its own Gliding Club—the Newcastle Mechanical Club Gliding Section has Mr. Leslie Runciman as its president and has had a short address on the seriousness of gliding from him. Applications for membership should be made to Mr. A. P. Miller, 27, Philiphaugh, Wallsend-on-Tyne.

**THE SAIL-PLANE CLUB** of the Model Aeroplane Club held a general meeting on Sunday morning last at the Castle Hotel, Bramber, Sussex. Mr. A. E. Jones took the chair, and touched upon the remarkable progress the club had made taking into consideration its late start (in August). The club, he thought, could congratulate itself on its wonderful ground, which was, so far as he knew, unequalled from a practical point of view, and no less than three clubs had approached the Sail-Plane Club requesting arrangements to use the ground. The subscription rate, which was higher than many clubs, had also proved to be sound finance, and the club have every reason to look forward to a year of brilliant progress. The secretary announced that applications for membership continued to flow in, 14 having been received during the previous 10 days.

Several visitors were present, and after an excellent lunch at the Castle Hotel, the entire meeting motored over to the gliding ground at Smallhole. Whilst the training machine was brought out, visitors inspected the grounds, and were shown how gliding is possible irrespective of wind direction, whilst the ground formation is ideal for soaring flight. Despite a patchy fog which came over just as the machine was ready, it was taken up for a series of short flights by the members present, demonstrating to visitors the system of training.

At the end of the day, Mr. C. Compton-Paterson volunteered to save the handling party work by flying the glider back to the farm. Accordingly, he was launched from a point about 400 ft., and, crossing the car park and tree-lined main road with about 150 ft. to spare, made a perfect landing in a field adjacent to Horton Farm. The flight was timed at 65 seconds.

Gliding takes place each fine Sunday. Road maps and particulars on application to the Hon. Secretary, E. G. Smettem, 2, Wine Office Court, Fleet Street, London, E.C.4.



# AIRISMS FROM THE FOUR WINDS

## Mrs. Victor Bruce

THE Hon. Mrs. Victor Bruce, who was, as reported last week, held up on her flight to Tokio in Indo-China by bad weather, continued her journey on November 6 and reached Hanoi. She accomplished the difficult journey over the Annamite mountains in very unpleasant and stormy weather. Proceeding on November 9, she left, accompanied by a French Military Squadron, for Hong Kong, which was reached safely early in the afternoon. Mrs. Bruce, who is flying a Blackburn "Bluebird," has been invested by the French Indo-Chinese Government with the insignia of the Order of "The Million Elephants."

## Mr. Oscar Garden in Australia

MR. OSCAR GARDEN, who flew from Croydon to Australia in a "Gipsy Moth," left Wyndham on November 5 en route for Sydney. He reached Alice Springs that day, Broken Hill on November 6 and Sydney on November 7.

## Paris-Calcutta in 3½ Days

Two French airmen, Capt. Goulette and M. Lalouette, have just accomplished a record flight from Paris to Calcutta during an attempt to reach Saigon within five days. They left Le Bourget on November 7 in a Farman F. 190 (230-h.p. "Titan"), and flying via Aleppo, Basra and Jask, reached Karachi on November 10. Calcutta was reached next day, and on November 12 they proceeded on their way to Saigon.

## Portuguese Flight to India

CAPT. CARDOSA and Lt. Pimental, the two Portuguese airmen who are flying from Lisbon to Portuguese India, reached Benghazi on November 6.

## R.A.F. Visit to Siam

IN return to the flying visit to India of members of the Royal Siamese Air Force last year, Air Marshal Sir Geoffrey Salmond, Air Officer Commanding R.A.F., India, and a party of officers and airmen left Delhi on November 2 for Bangkok, Siam. They arrived at Bangkok, in three R.A.F. machines, on November 6—on the occasion of the King of Siam's birthday. They were due to leave Bangkok for Singapore early this week.

## The R.A.F. West African Flight

THE flight of No. 47 Bomber Squadron, which has flown from Cairo to Bathurst, in Gambia Colony, started back on Monday, November 9, and arrived at Bamako at dusk.

## Air Commodore Kingsford Smith

MR. GREEN, the Australian Minister of Defence, announced in the House of Representatives in Canberra on November 4, that Wing Commander Kingsford Smith had been created an air commodore, the highest rank in the Australian Air Force, in recognition of his record flight from England to Australia. In offering our congratulations to the Air Commodore, we also extend our sincere sympathy in the loss of his father, who died in Sydney last week. On November 4, Air Commodore Kingsford Smith, in accordance with his father's wish, scattered his father's ashes over the waters of the Pacific Ocean from the aeroplane *Southern Cross*.

## A Kenya Visit

SQD./LDR. THE HON. F. E. GUEST and Mr. Norman Holden have recently left to pay a visit to their joint property in Kenya, where it is understood they will be remaining until about the end of January. As is natural, they will be travelling the major part of the journey out by air, and for this purposed Mr. Holden has sent his pilot, Mr. Hordern, to Cairo with his Avian (Gipsy II) and Sqd./Ldr. Guest has sent his two "Tom-Tits," these will be piloted by Sqd./Ldr. Wynne-Eyton and Flt. Sgt. Price.

## Japanese Flying Officers

CAPTAINS AOKI AND SUGANAMI, of the Military Air Service of Japan, have been attached to Tangmere station, from November 6 to 9, inclusive, to study the work of fighter squadrons.

## "Aircraft," of Melbourne

WE are informed that our Melbourne contemporary, *Aircraft*, has been acquired on and from the October issue by The United Press Pty., Ltd., of 62-74, Flinders Street, Melbourne, which is associated with the largest publishing house in Australia, i.e., the Herald and Weekly Times, Ltd., which publishes the *Herald* and the *Sun News Pictorial*, as well as several weekly and monthly papers. The new editor, Mr. Alan S. Moyle, who has taken over from Mr. E. J. Hart (the founder of the paper), is well known in flying circles in Australia. *Aircraft* will continue to be represented in London by Maj. F. A. de V. Robertson. Copies are always on sale at the office of FLIGHT, 36, Great Queen Street, W.C.2.

## Sir Samuel Hoare's Appointment

SIR SAMUEL HOARE, M.P., Air Minister in the last Con-

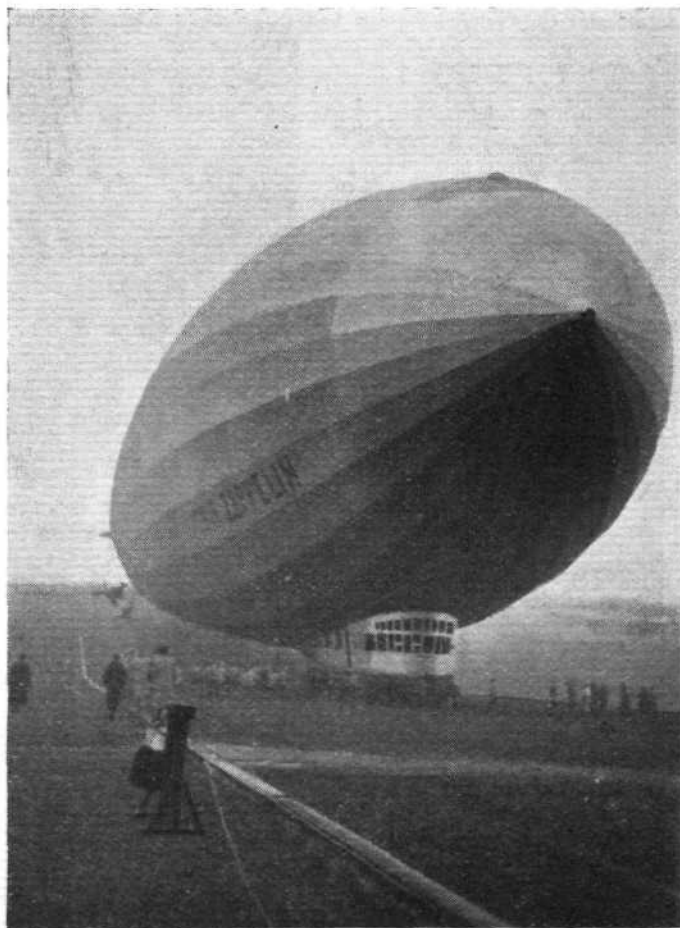
servative Government, has been appointed Honorary Air Commodore of No. 601 (County of London) (Bomber) Squadron, Auxiliary Air Force.

## Napier Engines for Abroad

IN addition to the Napier "Lion" engines installed in the Fairey "III F" machines ordered by the Greek Government—to which we recently referred elsewhere—the Imperial Japanese Government have also placed a further order for Napier "Lions," which will be fitted to Japanese-built aircraft.

## The "Wessex" On Tour

ON October 3, a demonstration Westland "Wessex" three-engined six-seater cabin monoplane took off from the aerodrome of its designers, the Westland Aircraft Works of Yeovil, on the first stage of a two month's tour of Great Britain and Ireland. This tour has been divided into two sections, each of one month's duration, and has been organised in order to bring before the larger business concerns, Airline operating companies, air survey corporations, etc., the part that aviation in general and the "Wessex" in particular can fill in all forms of modern commerce as a safe, fast and economical means of transport. Mayors, town councillors and leading local notables and industrialists have accepted the invitation to fly in the "Wessex" at their local aerodromes and in every case have been most favourably impressed. Some of these visitors experienced their first flight at the "Wessex" demonstration, and are now safely converted to the ranks of the air-minded; while considerable interest in the "Wessex" as a business proposition has been roused in certain important industrial circles. The second stage of the tour started on Thursday, October 30, the machine proceeding to Hull. Amongst other places that will be visited are such towns as Leeds, Newcastle, Edinburgh, Glasgow, Belfast, Dublin, Liverpool, Blackpool, Manchester and the surrounding district, Nottingham, Birmingham, Coventry, Reading, Bristol, etc.



HOW "GRAF ZEPPELIN" IS HANDLED: This picture of the "Graf Zeppelin" at Friedrichshafen shows the anchorage rails, running from the shed, to which the airship is secured, by trolleys, as she is taken out of or into the shed.



# AIR TRANSPORT

## THE Do.X IN ENGLAND

**A**FTER several delays and postponements, owing to unsuitable weather, the huge Dornier "Do.X" flying-boat, which is attempting a flight by stages from Germany to America, arrived in England on November 10. The "Do.X," it will be remembered, is expected to make the journey via Lisbon, the Azores, and Bermuda. With a crew of fourteen, including Capt. Christiansen (commander), Herr Merz (first pilot, of Luft Hansa), C. H. Schildhauer (second pilot, an American), and Dr. Dornier, the designer, the "Do.X" (which is powered with 12 Curtiss 600-h.p. "Conqueror" engines) left Lake Constance for Amsterdam, on November 5 on the first stage of the flight.

Flying over the course of the Rhine, the "Do.X" flew at about 1,600 ft. up to the Dutch frontier, and then, owing to bad visibility, came down to a few hundred feet. She arrived at the naval airport of Schellingwaude, Amsterdam, at 4.25 p.m., where Vice-Admiral Quant and his staff, officials and the German Consul-General welcomed the captain and crew.

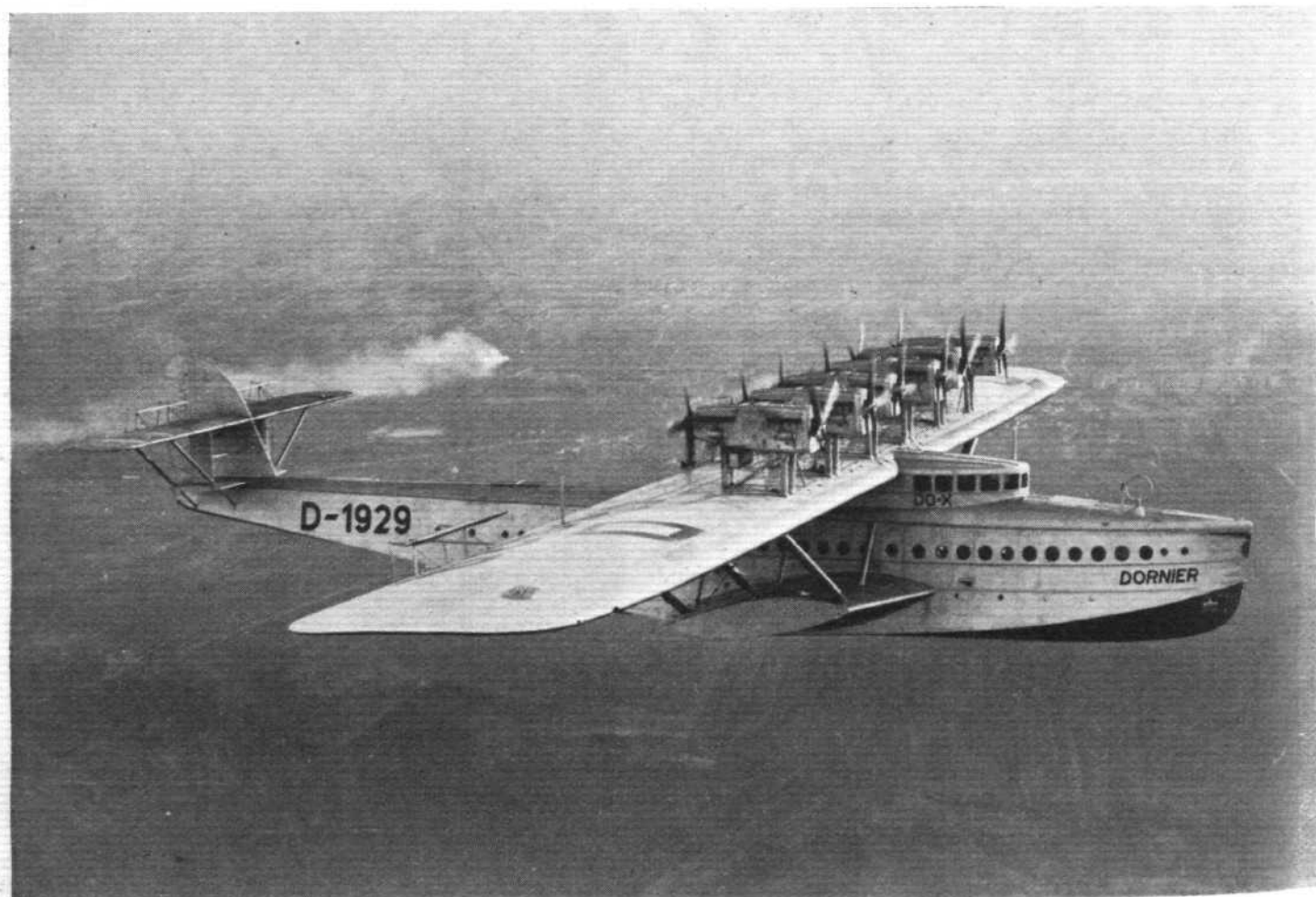
Bad weather delayed the start for Calshot until November 10, when the giant flying-boat left Amsterdam just before noon with a crew of 15 and 23 passengers on board—including Dr. and Mrs. Dornier and Lady Drummond Hay. Following the coast to Ostend and Dunkirk, the "Do.X" crossed the Channel towards Hastings, then, passing along the coast, arrived over Southampton at about 3.30 p.m.

The "flying-ship" was accompanied by about twenty "smaller fry—Service and civilian"—and, after circling round, alighted gracefully, if somewhat fast, off Calshot Air Station. Captain, designer and crew were then welcomed



**Herr Merz, first pilot (left), and Capt. Christiansen, Commander of the Do.X.** (FLIGHT Photo.)

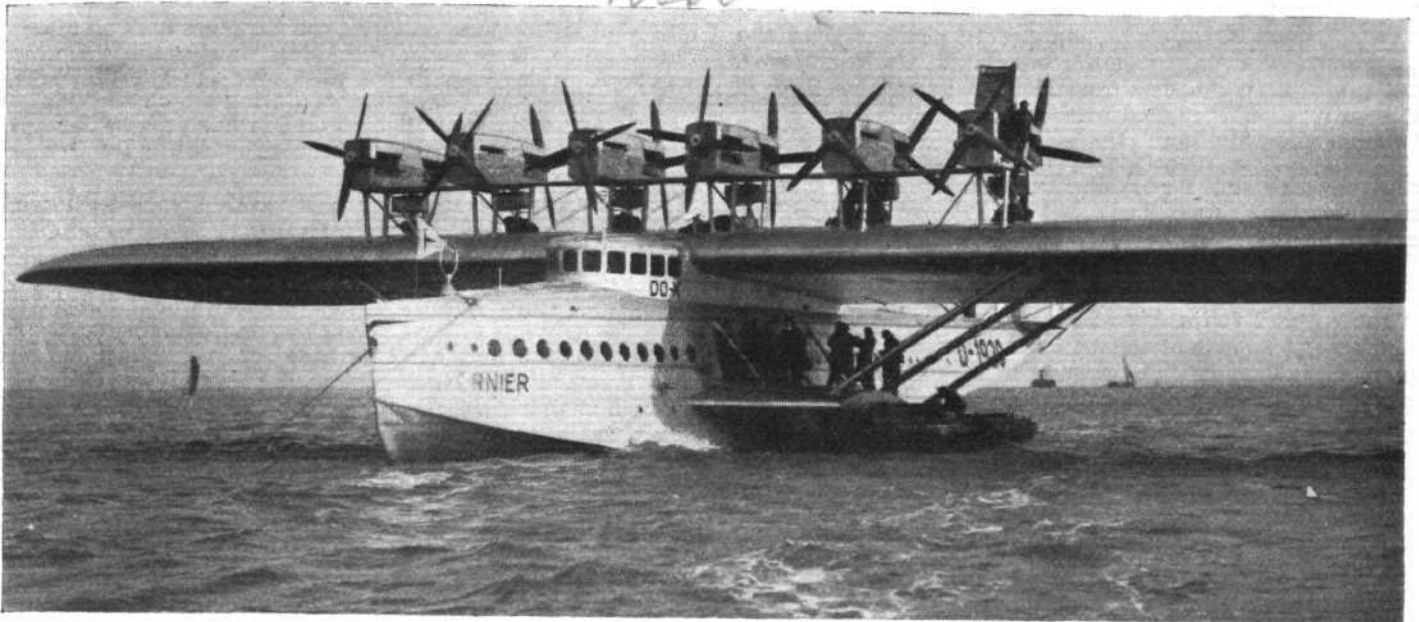
(after Customs and other formalities) by Air Vice-Marshal Lambe, A.O.C., Coastal Area; Air Commodore Bigsworth, Commanding No. 10 Group; and Group Captain Nanson, Commanding Calshot Base. Later, Dr. Dornier left by motor-boat for Southampton, and London, with the Master of Sempill, Lady Swaythling and Lady Drogheda.



**EN ROUTE FOR ENGLAND :** An aerial view showing the Dornier Do.X flying over the Rhine en route for Amsterdam on the first stage of her flight to America, via England and Lisbon.

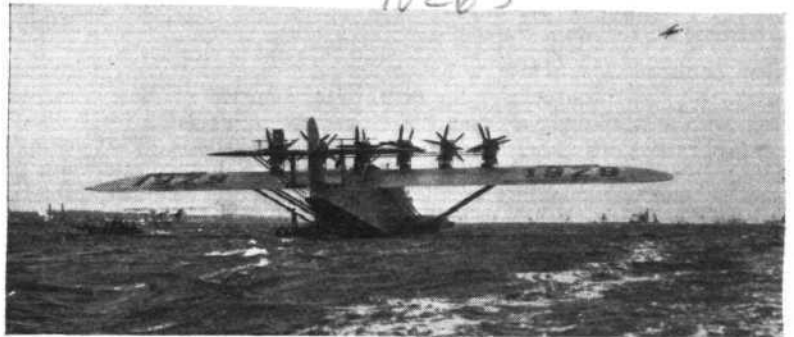


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**CURIOSITY FOR THE CURIOUS:** Above, Visitors—of which there were many—going aboard the Do.X at Calshot. On the right, another view of the “flying ship” at her moorings.

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## THE DO.X IN ENGLAND

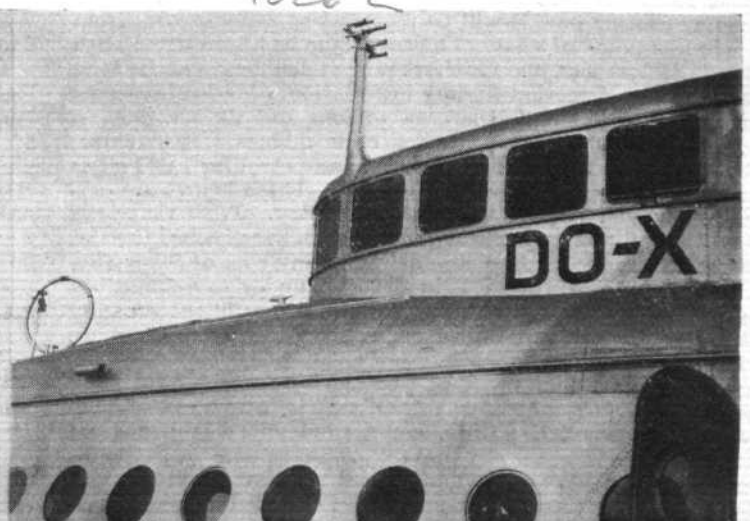
**SOME DETAILS OF THE DO.X:** On the right, a close-up of the tail. Below (left), some of the twelve 600 h.p. Curtiss “Conqueror” engines, and (right), the control cabin. (FLIGHT Photos.)



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During the next two days numbers of people visited and inspected the "Do.X" at her moorings. On Wednesday, the Prince of Wales flew from Hendon to Southampton in the Saro "Cloud," piloted by Capt. F. Scott, the amphibian landing alongside the "Do.X." The Prince boarded the "Do.X" and was received by Dr. and Mrs. Dornier, Capt. Christiansen and Sir Philip Sassoon, and shortly after the flying boat slipped her moorings, taxied out into Southampton Water towards Lee-on-Solent. She then turned

into wind and opening out her twelve engines took off after a run of some 30 seconds. Climbing slowly, the "Do.X." was soon lost to view in the mist over the Isle of Wight, and after half an hour's flight (during which the Prince took over the controls) alighted on Southampton Water and taxied up to her moorings. After congratulating Dr. Dornier and Capt. Christiansen, the Prince flew back to Hendon.

It was stated that the "Do.X" would leave Calshot to-day (Friday) for Bordeaux and Lisbon.

### The England-India Air Mail

At the request of the Indian authorities, and to allow users of the England-India air mail a longer period in which to reply to letters from England, the departure of the weekly mail from Karachi to England has been retarded from Tuesday to Wednesday each week. Thus, a business man in India who has received a letter by air from London on Saturday has now until the following Tuesday night in which to reply. The air mail leaving Karachi each Wednesday will arrive in London on the following Wednesday. The mail leaving London each Saturday morning arrives in India on the following Saturday.

### Doncaster Municipal Airport

THE Doncaster Corporation have decided to proceed with plans prepared by Sir Alan Cobham for a Doncaster Municipal aerodrome at a cost of £120,000.

### New Zealand Air Mails

It was announced by the Postmaster-General of New Zealand, on November 4, that the Government intended to call for tenders for the transport of Dominion air mail. He stated they would not be prepared to grant an immediate subsidy, but were willing to allow the contracting firm to have the receipts of the air mail stamps, less a certain percentage of the amount to cover the cost of transporting the air mails from air port to post office. It is also reported that New Zealand's first regular air passenger service was inaugurated, on November 6, between New Plymouth and

Wellington, while another service, between Christchurch and Dunedin, was due to start operations on November 6.

### Canadian Rail and Air Combine

THE Canadian Government has issued an Order in Council enabling the Canadian National Railways to participate with the Canadian Pacific Railway, the Western Canada Airways, Ltd., and the Aviation Corporation of Canada, in the formation of a large company, to be known as Canadian Airways, Ltd. Each railway will subscribe £50,000 as capital, and it is expected that they will increase their financial holdings later. The president of the company is Mr. J. A. Richardson, a Winnipeg financier, and the joint vice-presidents are Mr. E. W. Beatty and Sir Henry Thornton, representing the Canadian Pacific and Canadian National Railways, respectively. The air services will be complementary to the rail services.

### Zeppelin Airship to Use Helium

DR. ECKENER has announced that as a result of the disaster to R 101, the Zeppelin company has stopped work on its new ship, LZ 128, and was redesigning it for inflation with helium gas. It would also be driven by heavy-oil compression-ignition engines instead of engines using "Blau" gas fuel. This would mean a delay of a year in completing LZ 128, but in the circumstances they had no choice. He said that he had made it clear years ago, in discussion with American bankers, that airship services could only be operated by ships inflated with helium. The change was made possible now by the welcome announcement that the United States would allow the export of that gas.

## CROYDON WEEKLY NOTES

**F**LYING schools and clubs may be interested to hear the fate of a pest who appeared recently at the Surrey Aero Club. He asked for instruction for his "B" licence, payment for which was to be made when he had secured a mythical job with an equally mythical club at a South Coast resort. After 10 minutes' dual instruction, running up an account at the local hotel and borrowing considerable sums from various club members he was run out of the aerodrome. A cross-country chase followed, and he was last seen emerging from a particularly green and smelly pond near Penshurst into which he had been flung. It will be interesting to know if he reappeared anywhere else in civil aviation.

Last Thursday, November 6, Mr. Smirnoff brought in the Fokker FIX from Amsterdam. We have had some more information about this most useful machine from the K.L.M. representatives. It is shortly to be taken out on the Dutch East Indies service by Smirnoff and though the trip is a regular routine one, it will be regarded as experimental from a wireless point of view. The aeroplane has been fitted with three wireless sets, one for short range telephony, one for long range, and a direction finding installation. With the weight of all this equipment, the crew of four and their rations, a complete set of spare parts for both engines and machine, the FIX has a pay load of 1,760 lb. and petrol for 1,000 miles at a cruising speed of over 120 m.p.h. These figures are officially certified by the Dutch Air Ministry. With that load it will still fly on any two engines at a ceiling of 3,000 ft., and seems to supply a complete answer to any sort of fog flying. The confidence of its pilots in the FIX under any conditions is proved by their preference for the 400-mile sea crossing between Athens and Cairo, even when the overland route via Constantinople is open.

The wireless equipment of this machine works on a fixed aerial, a system which was tried out in the Imperial Airways' "Argosy" G-EBLO, some time ago. It has great advantages for with the present arrangement the operator must wind in his aerial at a critical moment when over his terminal aerodrome. Should the Control Tower want to give the pilot last minute instructions, it is impossible unless

his aerial is fixed. The late Sir Sefton Brancker was tremendously impressed with Capt. Willcockson's demonstration in G-EBLO.

The transatlantic Bellanca "Columbia" is being seen frequently at Croydon. Last Wednesday, Capt. Boyd and Lieut. Connor brought her back from Berlin, but left again the following day for Paris. After three days there they returned to Croydon again on Monday, the 10th.

It is hoped that F.O. J. J. Flynn, will be sufficiently recovered by the end of this week to be brought back from Boulogne to Croydon. More tributes to the skill and efficiency of the unfortunate engineer, Mr. F. H. Mason, have come to us during the week. Many of Imperial Airways' well-known pilots declare him to have been the best flight mechanic they have ever known. Mason made many of the earliest flights on the London-Paris run in 1919, and had been associated with many long and difficult jobs since then. Whatever hard circumstances arose, Mason could always be trusted in everything.

The great race home with pictures of the King of Kings, Ras-Tafari, of Abyssinia, finished on Friday, when Messrs. Hope and Birkett reached Croydon in a Puss Moth. Instead of taking the normal 15 days by surface transport, the photographs were rushed through the 5,000 miles in five days. Great risks were undoubtedly taken, particularly over the unknown country between Addis Abbaba and Cairo. They were flying for the "Daily Mirror," the "Daily Mail" and the "British Movietone News."

In the meantime Major Clarke had been fighting an even greater battle in Personal Flying Service's "Junkers." He was ill when he left Addis Abbaba, but he struggled on until he finally collapsed at Tunis. Here a day was lost, but his photographs, which were for the "Daily Sketch," were taken by seaplane from Tunis to Marseilles and telegraphed from there, reaching their destination at the same time as those for the "Daily Mirror." It was a game fight, and Major Clarke certainly deserves our congratulations.

This week's traffic figures show 268 passengers and 32 tons of freight.



## THE D'ASCANIO HELICOPTER

### A Successful Italian Experiment

**T**HROUGH the courtesy of Lt.-Col. P. F. Bitossi, Air Attaché to the Italian Embassy, we are able this week to publish an illustration, and a few particulars, of the Italian D'Ascanio helicopter, which recently broke the existing helicopter records for endurance, distance and altitude.

The D'Ascanio helicopter, which is still in the experimental stage, has already accomplished several successful flights at the Ciampino Nord Aerodrome, both in the open and inside the airship hangar there. As will be seen from the illustration, it consists of a cruciform framework fuselage surmounted, in the centre by two large horizontal "propellers," rotating in opposite directions. The blades of these "propellers" take the form of aerofoils, complete with tail elevator (at the outer tip), and jointed at the roots, so that they are free to take up, automatically, any angle of incidence determined by the tail-elevators.

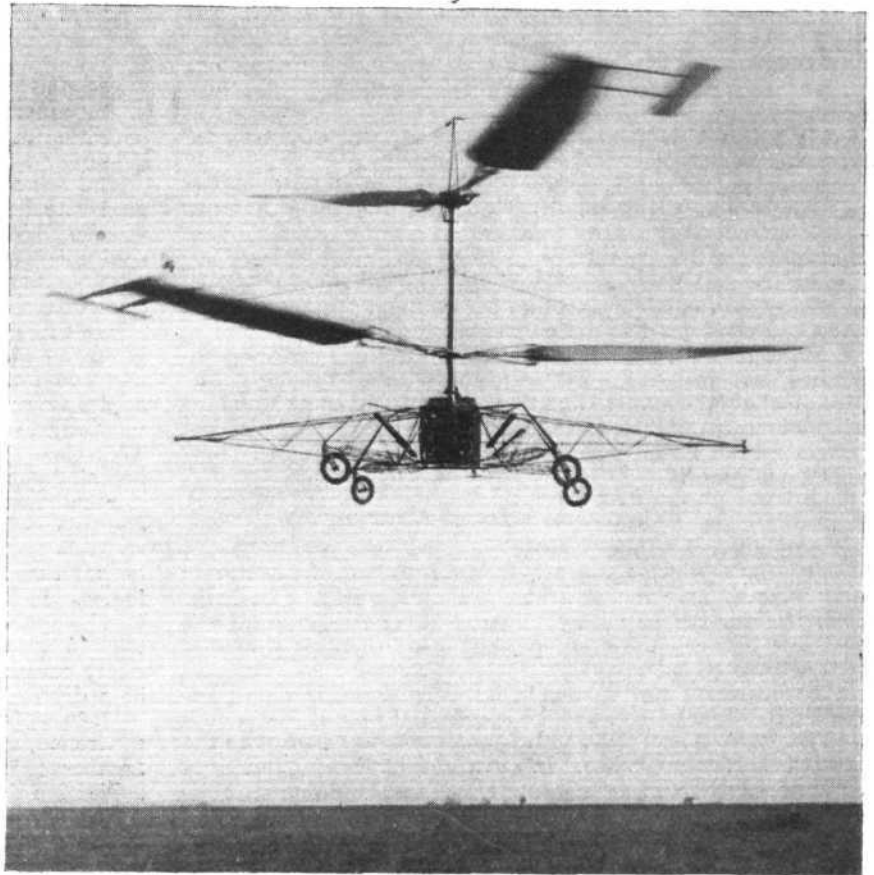
Thus, by operating the tail-elevators, the pilot can vary the angle of the blades, thereby controlling the ascent and descent of the machine. The propellers, it may be mentioned, are used as "parachutes" should the engine cease to function.

Horizontal flight is obtained by inclining the machine in the direction one wishes to take, which is achieved by means of small horizontal propellers mounted on the fuselage extremities.

The machine is a single-seater, weighing about 800 kg. (1,764 lb.), and is fitted with a 95-h.p. Fiat A.50 S. engine. During the tests at the Ciampino Aerodrome, the machine took off from and landed in the same space, a circle of only 15 m. (49 ft.), and maintained a steady, hovering flight at an altitude of over 4 m. (13 ft.) for a considerable period. Then, at a given signal, the machine descended and effected a safe landing. It subsequently flew in a closed circuit of 1 km., and from one end of the aerodrome to the other, thus securing a world's record (helicopters) for distance in a straight line.

The endurance record was also secured with a flight of 8 min. 45½ sec., while the record for altitude was obtained with a height of 18 m. (59 ft.).

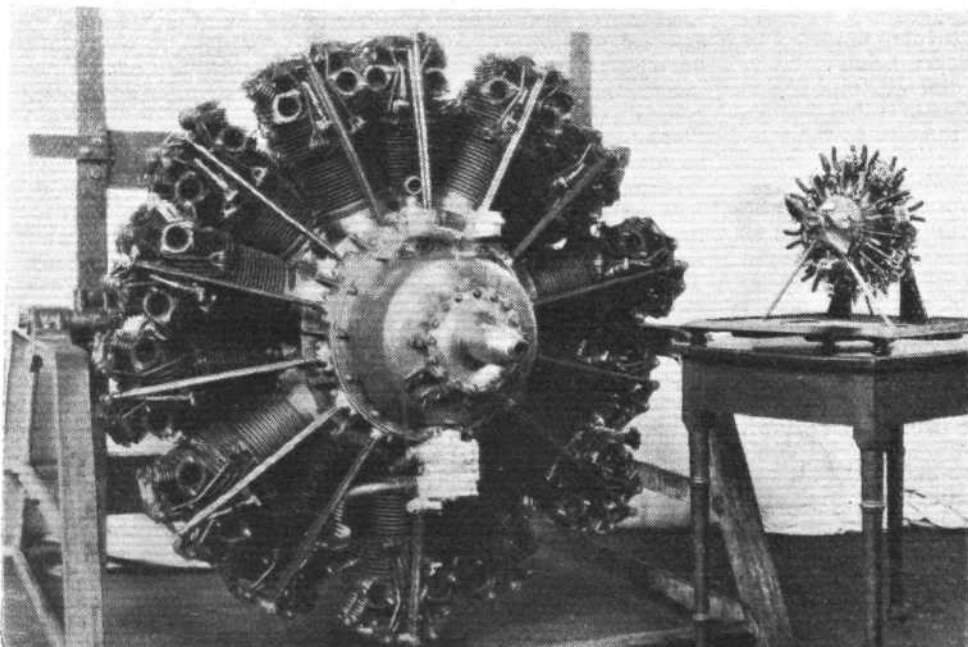
This helicopter also carried out further demonstration flights inside the airship hangar, where, in spite of disturbing



**AN ITALIAN HELICOPTER:** An interesting photograph of the D'Ascanio helicopter in flight at the Ciampino Nord Aerodrome.

air eddies, produced by the presence of the hangar walls, the machine performed evolutions in all directions, remaining aloft for several minutes. During some tests, the pilot let go all controls, and the machine remained perfectly steady.

Up to the present, the flights carried out with this helicopter have been made only to demonstrate the soundness of the principle, and with the valuable data thus collected, the designer states that the next machine will be able to demonstrate its practical use.



**DIGNITY AND IMPUDENCE:** A working model of the Armstrong Siddeley "Jaguar" aero engine side-by-side with the original. The model (winner of the Championship Cup at the recent Model Engineering Exhibition), made by Mr. Gerald Smith, develops 15 h.p. and weighs 30 lbs.

# TESTING AEROPLANE CONTROLS

By H. L. STEVENS

ON November 13, Mr. H. L. Stevens, A.F.R.Ae.S., delivered his lecture on "Testing Aeroplane Controls" before the Royal Aeronautical Society. As this lecture was of considerable interest, we are publishing it in full, although, owing to pressure on our space, we are forced to divide it into two instalments, commencing below, with the first this week.

Before beginning this lecture I have first of all to thank the Air Ministry for permission to give it and to explain that any opinions expressed are my own and do not necessarily reflect the opinion of the Air Ministry. Secondly I must express my appreciation of the honour conferred on me by the Society in asking me to deliver a lecture before them; though I wish they had chosen a less difficult subject.

As regards the title of this lecture, it sounds very circumscribed, but you can't test anything without having a fair idea of what its complete function is or without some standard of reference: and in trying to discuss these parts of the problem I am afraid you will find that I have been, if anything, too general.

## Characteristics of Aircraft

Aeroplanes, I think, can be divided into three classes. The *obstinate*, which again sub-divides into two, the obstinate and vicious, and the obstinate and self-willed. The *self-controlled* and the *easy going*. There is, of course, no hard and fast line between these groups, but some such classification will help us to fix our ideas.

The obstinate and vicious in its worst form, is highly unstable, it wants to dive at high speeds and rear at low speeds and the more it gets its way the harder it is to return it to the straight and narrow path. It has a violent turning tendency at slow speeds, and swings taking off and landing. If accidentally stalled it drops a wing and spins straight away, and if allowed to spin for any length of time refuses to come out until the pilot has decided to leave by parachute. Its controls are heavy, more particularly when trying to return it from one of its more violent excursions. Of course all these things are not likely to happen at once, for if they did the aeroplane would not get as far as a testing station.

The cure for fore and aft instability is to move the C.G. forward. The alternative of fitting a larger tail doesn't always work as the C.G. comes back still farther with the extra weight of the tail. The same applies to a lengthened fuselage if the aeroplane has been originally designed too short, but in my own opinion a reasonably long fuselage is the best insurance against most of the troubles arising from inadequate tail organs.

The cure for a big turning tendency in the air is an increase in airscrew diameter; turning tendency is roughly inversely proportional to the fourth power of the airscrew diameter. Alternatively the fin may be set over, or fin and rudder cambered on one side to divide the tendency between climbing and gliding, remembering that owing to the extra speed over the fin, due to slip stream when climbing, a reduction caused by offsetting the fin will appear only as a turning tendency of about one-third this amount in the gliding condition.

The cure for swinging on the ground is difficult to prescribe as there is very little information as to what it is due to. An adjustment of the position of the wheels relative to the C.G. is sometimes effective.

The cure for dropping a wing at the stall is usually slots. But aircraft without slots do not all drop a wing at the stall, consequently although slots are undoubtedly the most effective cure when the tendency is present it follows that careful design in the first place might have reduced the tendency to small dimensions. Shape and section of wing tips has, I believe, a large effect, and a wing section with a flat topped lift curve should be good in this respect. Once the ailerons have been used at the stall, however, I feel that the slot is the only certain preventative of the incipient spin.

The flat spin or prolonged spin from which the aircraft cannot be brought out is a very nasty thing. Here I don't think slots are a cure. In fact I believe in America it was found that opening the slot in a long spin actually made the aircraft spin faster. The cure here is more and better disposed fin area and, above all, a long fuselage. Concentration of the main masses in the longitudinal direction should help according to theory.

The obstinate and well meaning aircraft is highly stable. It requires large forces or large control angles or both to break its will. On the other hand, it responds to every gust and can

be kept quiet only with difficulty in bumpy weather. It probably also has a large change of trim engine on and off. It knows also that the pilot ought to put its nose down when the engine is cut off.

The cures for this case are a backward movement of the C.G., reduction in the areas of the stabilising surfaces, a reduction in dihedral angle and effective balancing of the controls.

The self-controlled aircraft may be classed as one with a moderate degree of stability, and can be flown hands off at all speeds. If flown feet off it should only turn gently. It won't spin unless it is made to and comes out by itself if the controls are abandoned. It does not drop a wing at the stall, or if it does, does so mildly; and it can be brought to a level keel with a small loss of height. The nose is well up at the stall, thus giving an effective warning to the pilot. The controls do what one would expect at all speeds and only moderate forces and angles are required for fighting manoeuvres. It doesn't respond violently to bumps and any such response is easily checked. This class is really a mild case of the obstinate and well meaning.

Finally we have the easy going. This class is stable with controls held fixed, and neutral or slightly unstable with controls free. It has no fixed ideas about anything and can be put through all manoeuvres with small control angles and forces. It has very little change of trim engine on and off. Can be spun and should recover on centralisation of the controls in a not too steep dive. Little response to bumps and easily corrected. It has a small turning circle and is steady in a dive.

Of these four classes it is suggested that class three, the self-controlled, is the class wanted for commercial work and for bombers; while class four, the easy going, is wanted for exhibition flying and fighting.

The above classification is, of course, very arbitrary, and the four classes merge imperceptibly into each other, but it may help to clarify our ideas somewhat, and it shows how stability and control are usually involved together.

## Desirable Characteristics of Controls

Having now taken a very general survey of aircraft as they exist, let us now get down to details and consider what we might ask of controls if we had Aladdin's lamp and it worked.

### Control Instinctive

First and foremost I think control should be absolutely instinctive. It is true that anything becomes instinctive after sufficient experience but in a game like flying, where a mistake may be at the least very expensive, the fewer new instincts one has to acquire the better.

In the ideal case one would merely sit in the aircraft and move one's body slightly the way one wanted to go and the aeroplane would duly go there, quickly or slowly, according to the speed of one's own movements.

This being perhaps slightly futuristic, the next best thing is a lever or levers which we move in the direction we want the aircraft to move. And now I must confess to a dreadful heresy; I think the rudder controls work backwards and violate the rule above for an instinctive control. All the other controls that I can think of fit in. Fore and aft and laterally you move the control stick about its axes in the same direction as you want the aircraft to move about its corresponding axes. You push the throttle forward when you want to go forward and you pull it back when you want to stop. You pull the brake lever back when you want to stop. Even the switch is right, the knob is up for going up and down for coming down. The tail wheel works the same way as the stick. In the case of the rudder bar, when you want the right side of the aeroplane to go on and the left side to slow up, you push the left side of the bar forward and the right side back. If you imagine an aeroplane controlled by a wheel on top of the stick in which fore and aft and lateral movements were as at present, but the wheel worked the rudder, you can see how absurd it would be to connect the wheel up the opposite way to a car wheel. I believe it is a legacy from the sea on which, I understand, you port your helm when you want to go to starboard, and the rudder bar being tucked away where we can't see it we have got used to it and it has become instinctive. Nevertheless it causes some trouble to beginners.

### Control Progressive

The next ideal condition is that the response of the aircraft should be proportional to the control movement in all



conditions of flight and should be correspondingly rapid as the forward speed of the aircraft is increased. In driving a car on a perfectly non-skidding surface a given angular displacement of the wheel produces an angular velocity proportional to this displacement and to the speed of the car. Now if it wasn't for gravity I think you would find that a given fore and aft movement of the stick in an aeroplane would also produce a turn in the appropriate plane of a given radius, and a given lateral displacement and corkscrew motion of a given pitch, both independent of the speed of the aircraft, consequently, as in the case of the car, the angular velocity would be proportional to control angles and forward speed. I haven't thought whether the analogy can be driven further to include the rudder, and as, in practice, gravity cannot be neglected and these ideal conditions do not apply, perhaps it is not worth while.

In the practical case, the wings which supply the main portion of the centrifugal force for turns and loops also support the aircraft. The extra lift for centrifugal force is supplied by temporarily increasing the incidences. As the speed is reduced the weight can only be supported by increasing the incidence also. Beyond a certain incidence the lift ceases to increase. Consequently, as the speed is reduced, the margin of lift for centrifugal force gets steadily less until at the stall no margin is left. This is why the result of gliding into land too slowly is usually a "pancake," as there is no excess lift available to curve the path of the aircraft parallel to the ground, or in ordinary words, flatten it out, so the ground does it instead.

In other words and returning to the car analogy, if the car behaved like an aeroplane and you drove up to a curve too slowly, you wouldn't be able to turn and skirt it but would slide into it bodily sideways. Speed is a very important factor, not only in the rate of rotation obtained from a control, but also in the radius of turn obtained, particularly in the vertical plane as required for flattening out to land.

However, at speeds reasonably removed from the stall, it appears fairly easy to achieve a control which will give a response proportional to its displacement. That implies no dead spots, no sluggishness for small control angles and then a sudden response for slightly larger angles. And the aircraft should be capable of being returned to an even keel as readily as it can be disturbed from it.

### Controls Independent

The next ideal condition is that the controls should be independent. By this I mean that movement of the controlling organ should produce initially at any rate, a motion of the aircraft about the same axis and that axis only. This is satisfied by the elevator control and fairly well by the rudder and aileron controls at all normal speeds. It is very far from satisfied by normal aileron controls near the stall. I will return to the problem of the stall later, but this defection of aileron controls at the stall and the pronounced rudder or yawing effect which they give is all the more dangerous because it is different from their effect in normal flight. In the ideal case all the controls would have similar relative effects at all speeds down to the stall, where, of course, the longitudinal characteristics must change, but the ailerons and rudder should continue to work for some time after this.

### Expenditure on Research

We have been asked to point out that in one of the curves which illustrated Mr. Fairey's paper "The Growth of Aviation," the vertical scale is wrong. This is Fig. 6, published on p. 1149 of our issue of October 17, 1930, which deals with the amounts spent on research by Great Britain and the United States. The amounts shown on the left-hand side of this figure are £10,000, £20,000 and £30,000. The figures should have been £100,000, £200,000 and £300,000. Readers who wish to have their copies accurate are asked to make the corrections.

### Navigation Lecture Alterations.

A SERIES of lectures which are being held at Gwydyr House at 6 p.m. every Tuesday and Friday, under the auspices of the Guild of Air Pilots and Air Navigators of the British Empire, has been slightly re-arranged and now stands as the table below. These lectures are being very well attended, with an average of over 20 each time. In case any readers did not see our previous notice, we may state that the complete course of lectures covers all subjects required for the Second Class Navigator's License Examination which will be held in March, 1931. Any inquiries concerning this course should be directed to Capt. A. G. Lamplugh, c/o British

### Controls in Harmony

Next the three controls should be in harmony with each other. By this I mean that the angles and forces required from each for general manœuvring should be of the same order. I don't know whether this can be specified more precisely; as a tentative suggestion we might lay down that equal forces and angles on the pilots' three controlling units should produce equal initial responses about the three corresponding axes. This suggestion would, I think, lead to relatively lighter ailerons than we have at present. We might perhaps go even further with the ailerons and make them lighter than the others as the direction in which one moves the control to operate them is the one in which it is hardest to exert much force. The objection can be raised that in practice one does not want to rotate at an equal rate about all three axes simultaneously, consequently, if the above specifications were satisfied equal forces would not be simultaneously experienced on all the controls; on the other hand, it seems reasonable to have to exert the biggest force about the axis one wants to turn round fastest.

This harmony of controls is more important than is, I think, generally realised; besides making all the difference between a really pleasant and an indifferent aeroplane, it may have quite a big influence on safety. There is no more dangerous aeroplane to the beginner than one in which light elevator and aileron controls are combined with a heavy rudder and a pronounced turning tendency.

### General

Response must be quick and snappy, especially for fighting and particularly for changing from a turn of one hand to one of the other. This manœuvre shows up heavy and ineffective ailerons quicker than any other.

The controls must be light to operate. I suggest a maximum force of ten pounds for any reasonable manœuvre. And friction should not be tolerated, except perhaps in the rudder control where it is not particularly important and can even be beneficial in stopping hunting and in holding the rudder against a slight turning tendency. Even then it goes against the grain and other methods should be used if possible.

The controls must not be tiring on long flights. This implies a suitable amount of balance and not too much lateral stability or too much work will be required correcting bumps. Also there must be very little turning tendency. A continuous pressure required from one foot of only three pounds is tiring after an hour's flight.

For getting off there should be no tendency to swing, the tail should come up quickly and the attitude should be well under control.

For landing there must be enough fore and aft control to make a three point landing neatly. The aircraft must not drop a wing at the last moment and again it must not swing when speed is lost.

For both landing and taking off the change of trim, due to slipstream, should be small, otherwise there is danger of a steep dive following engine failure, taking off and *vice-versa*, an attempt to save a bad landing by opening up the engine may result in a bad stall.

(To be concluded)

Aviation Insurance Group, Ltd., 3-4, Lime Street; London, E.C.3.

PROBABLE DATE.	SUBJECT.
Nov. 14	Plane Trigonometry. The Trigonometrical ratios. Constructions of Tables thereof.
" 18	Meteorology.
" 21	Form of the Earth. Definitions.
" 25	Middle latitude sailing. Calculations of courses and distances. Traverse Tables.
" 28-29	Time. Change of time with longitude. Zone time. G.M.T., L.M.T., L.S.T. Sunrise and sunset, moonrise and moonset. Use of nautical almanac.
Dec. 2	Meteorology.
" 5	(For other lectures, see FLIGHT for Oct. 31 last.)

### Meteoric Developments

WE learn that the Aircraft Investment Corporation have now started a manufacturing policy for the Meteor. Not only will this machine be built in England, but arrangements have recently been concluded whereby it will also be produced in Italy. It will be recollected that this machine recently made a visit to Italy piloted by a well-known "smoke bomb" expert. The outcome of this visit is that a preliminary batch of six machines has been laid down by the Piaggio Company, and it is understood that many times this number will be laid down as soon as this first six have proved themselves in that country.

# MODELS

## THE MODEL AIRCRAFT CLUB (T.M.A.C.)

**T**HE second indoor flying meeting of T.M.A.C., which was held on Thursday evening, November 6, at the Horticultural Hall, showed a great advance on the previous meeting: 60 members were present and 54 models took to the air. No competitions were scheduled and general flying was the order of the day so that members could tune up their models and judge what improvements and adjustments would be necessary for the Competition Meeting to be held on December 13, 1930.

Over 50 spectators came in to watch the flying and expressed their delight at the models and their performances. The daily press was also represented by Mr. W. May, who took some excellent photographs of the meeting.

Mr. Willis set out to beat his duration record of 75 seconds made at the last meeting, and succeeded in keeping his model aloft for 89 seconds.

Mr. T. Newell carried off the R.O.G. and Altitude figures with a beautifully constructed low-wing fuselage monoplane weighing just under  $\frac{1}{16}$  oz.: R.O.G. duration 43 seconds; altitude 35 ft. (the limit of the hall). There is no doubt that Mr. Newell's duration would have been considerably

longer if his model had not shown such a definite liking for "landing" on the cornice surrounding the hall. To see it flying up against the ceiling in the dimness behind the arc lamps is to realise the fine degree of perfection attained in the construction of such a model.

Mr. Burnett was getting very good results from a new model, which bids fair to uphold the traditions of its predecessors in the Burnett family. Mr. Dent had a new model flying but was not able to get just the correct power for good duration, 26 seconds being his average. Messrs. Gibson and Bennett put up a good show with biplane models.

Several members of the S.M.A.E. were there, including Mr. Bullock, who managed to put up 25 seconds' duration with his spar model, hand launched.

The next indoor flying meeting will be held in the Horticultural Hall on November 17, followed by another on December 10, whilst December 13 will be our Christmas meeting, at which we hope to make a talkie film and hold several competitions; entrance for which will be by T.M.A.C. membership card only. On the latter date flying will take place between 2 p.m. and 6 p.m., and on the other dates between 7 p.m. and 9 p.m.

Hon. Sec.: A. E. Jones, 48, Narcissus Road, Hampstead.

## WESTLAND AIRCRAFT SOCIETY (MODEL SECTION)

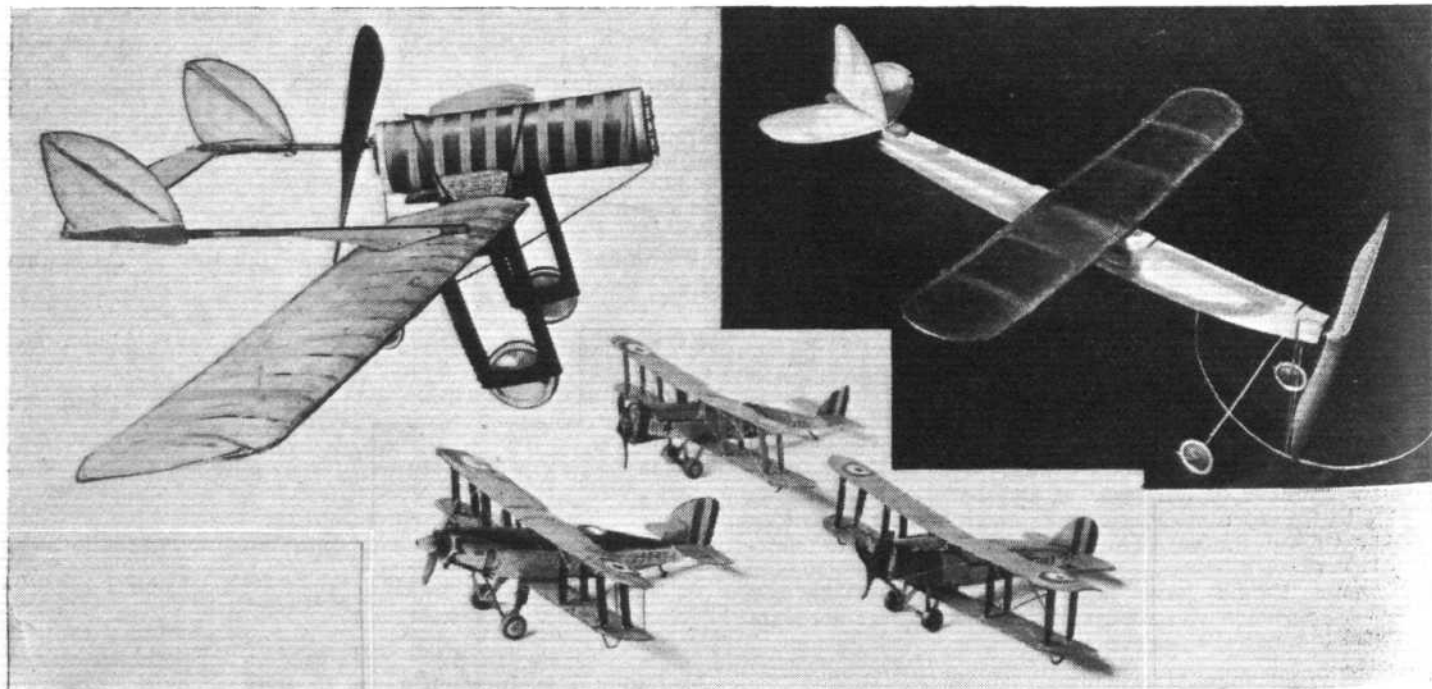
*Lecture on Model Aeroplanes.*—Some 50 members of the Model Section of the Westland Aircraft Society (The Yeovil Branch of the Royal Aeronautical Society) were addressed by Mr. E. Voss, on the subject of "Model Aeroplanes," at the Three Choughs Hotel, on Thursday, 23rd instant. The lecture was illustrated by a collection of lantern slides of models loaned by the Science Museum, South Kensington. Mr. V. S. Gaunt occupied the chair.

Mr. Voss generally outlined the historical development of flying machines, showing slides of Henson's model of proposed flying machine of 1843, and Stringfellow's model 1848, and differentiated between models such as those being made for experimental and research work, and those of existing types made for record. Most early attempts were by

means of gliders, but an interesting slide was of a replica of Hargreave's Ornithopter which simulated as far as possible the action of the wings of a bird.

After tracing the development of aircraft, slides were shown of models of more recent types. Mr. Voss pointed out technical steps taken to improve performance in individual types. In making models, Mr. Voss said much could be learned from those of simple construction and impressed upon members of the Section that many hours' work could be ruined in a first flight unless certain precautions were taken, notably in arranging the methods of attachment of components.

After some questions had been asked, the lecture was brought to a close by the proposition of a vote of thanks by Mr. H. A. Mettam, the remainder of the evening being spent in discussion of the models exhibited by members.



Three models exhibited at the Westland Aircraft Society (Model Section) Meeting. The first of the two power driven models, at top, is a distinctive "pusher": below will be seen scale models of a Fairey III.F, a D.H.9, and a Bristol "Fighter."

### Robinson Aircraft: New Address

WILL readers please note that the postal address of the Robinson Aircraft Co., Ltd., has been altered—although their works and offices and telephone number are as before. The new postal address is—Robinson Aircraft Co., Ltd., Stafford

Road, Croydon, Surrey, and the telegraphic address is "Redwing," Croydon.

### Change of Telephone Number

A. V. ROE & Co., LTD., notify us that their telephone number has been changed to Regent 3551—3552—3553.



# THE ROYAL AIR FORCE

London Gazette, November 4, 1930.

## General Duties Branch

The follg. are granted permanent comms. as Pilot Officers, with effect from Oct. 25, and with seny. of dates stated:—G. F. Goddard (April 25, 1929); Flying Officer G. Nelson (R.A.F.O.) (Oct. 25, 1929). The follg. are promoted, with effect from Nov. 5:—*Flight-Lieutenants to be Squadron-Leaders*.—H. M. Massey, M.C., D. H. de Burgh, A.F.C., W. F. Dickson, D.S.O., A.F.C., H. G. W. Lock, D.F.C., A.F.C., A. Rowan, T. C. Lukes, M.C., C. E. V. Porter, O. R. Gayford, D.F.C., R. A. George, M.C., K. B. Lloyd, A.F.C., E. R. Openshaw, O. W. de Putron, H. V. Rowley. *Flying Officers to be Flight-Lieutenants*.—H. C. V. Jolleff, T. N. McEvoy, F. G. H. Ewens, J. A. Hawkings, D. F. W. Atcherley, R. Kellett, A. D. Gillmore, R. C. Wilson, A. J. L. Hughes, C. A. Bell, H. A. Evans-Evans, R. E. Hall, F. S. Hodder, G. P. Chamberlain, J. R. Jones, F. M. V. May, P. E. Berryman, F. W. H. Hall, T. F. Moloney, W. G. Campbell, J. F. Griffiths, C. M. Heard. The following Pilot Officers are promoted to rank of Flying Officer:—R. H. C. Penney, F. A. Wardell (Oct. 2); E. H. Bellairs, E. L. Brackenbury, L. McHardy, W. R. A. Matheson, D. A. Messiter, L. F. H. Orr (Oct. 13). Sqdn.-Ldr. (acting Wing Commander) J. L. Vachell, M.C., relinquishes acting rank of Wing Commander (unpaid) (Oct. 18); Group Capt. J. R. W. Smyth-Pigott, D.S.O., is restored to full pay from half-pay (Oct. 30); Wing-Comdr. D. L. Allen, A.F.C., is placed on half-pay list, scale A (Nov. 1); Sqdn.-Ldr. T. P. Y. Moore is placed on half-pay list, scale A (Oct. 30 to Dec. 19); Sqdn.-Ldr. J. S. T. Fall, D.S.O., A.F.C., remains on half-pay, scale B (Nov. 1); Sqdn.-Ldr. A. N. Bengie is placed on retired list at his own request (Aug. 14). (Substituted for *Gazette* Aug. 19.) Flight Lt. D. S. E. Vines is transferred to Reserve, Class A (Aug. 15). (Substituted for *Gazette* Aug. 26.) Flight Lt. D. A. Fletcher (Capt., R.A.R.O.) resigns his short service commn. (Oct. 24).

## Stores Branch

Flight Lt. R. G. Gore is placed on retired list (Oct. 30); Flying Officer C. P. Marshall is transferred to Reserve, Class C (Aug. 10). (Substituted for *Gazette* Aug. 15.)

## Medical Branch

M. J. Cahalane, M.B., Ch.B., is granted a temp. commn. as Flight Lt. with effect from and with seny. of Oct. 3.

## Dental Branch

F. F. Kennedy, L.D.S., is granted a non-permanent commn. as Flying Officer with effect from and with seny. of Oct. 15.

## RESERVE OF AIR FORCE OFFICERS

### General Duties Branch

A. R. Prendergast is granted a commn. in Class A as a Flight-Lieutenant (Oct. 24). The follg. Pilot Officer of the Special Reserve is promoted to rank of Flying Officer:—D. W. Reid (April 8). Flight Lt. M. Ballard ceases to be employed with Regular Air Force (Nov. 1); Flying Officer P. K. Campbell is transferred from Class A to Class C (March 2).

The follg. Flying Officers relinquish their comms. on completion of service:—L. G. Pinnell (June 10); N. M. Ffrench (Aug. 29); W. J. E. Rodwell (Sept. 2); W. P. Wiltshire (Sept. 2); W. E. Lunnon (Sept. 16). The follg. relinquish their comms. on completion of service and are permitted to retain their rank (Oct. 24):—Flight Lt. E. P. Roberts, M.C., D.F.C., D.C.M.; Flying Officer G. W. Mahony-Whitton. Flying Officer G. Nelson relinquishes his commn. on appointment to a permanent commn. in R.A.F. (Oct. 25).

### Stores Branch

The follg. Flying Officers relinquish their comms. on completion of service:—H. D. Fletcher (Sept. 12); J. C. Daniels (Oct. 1).

## AUXILIARY AIR FORCE

### General Duties Branch

No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—The follg. Pilot Officers are promoted to the rank of Flying Officer:—B. S. Thynne (Sept. 30); T. L. E. B. Guinness (Sept. 30). Pilot Officer (Hon. Flying Officer) P. du Cane is promoted to rank of Flying Officer, with effect from Oct. 12, and with seny. of March 6.

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

### General Duties Branch

Wing Commander J. K. Wells, A.F.C., to Special Duty List, on appointment as R.A.F. Representative, Ordnance Committee, Woolwich, 27.10.30.

Squadron Leader A. T. Williams, to H.Q., Air Defence of Gt. Britain, Uxbridge, 27.10.30.

*Flight Lieutenants*: C. R. Strudwick, to Station H.Q., Upper Heyford, 22.10.30. A. E. Beilby, to Station H.Q., Donibristle, 14.10.30. G. V. T. Thomson, to R.A.F. Training Base, Leuchars, 14.10.30. H. E. Walker, M.C., D.F.C., to No. 45 Sqdn., Helwan, 6.10.30. R. M. Foster, D.F.C., to No. 70 Sqdn., Hinaidi, 18.10.30. S. H. Ware, to No. 24 Sqdn., Northolt, 3.11.30. H. J. Adkins, to Elec. & Wirelless School, Cranwell, 22.10.30. W. L. Payne to No. 503 Sqdn., Lincoln, 31.10.30. G. Combe, to H.Q., Wessex Bombing Area, Andover, 20.10.30. G. M. F. O'Brien, D.S.C., to No. 504 Sqdn., Nottingham, 27.10.30. C. W. Busk, M.C., A.F.C., to Armament & Gunnery School, Eastchurch, 30.10.30. W. E. G. Mann, D.F.C., to H.Q., Wessex Bombing Area, Andover, 1.11.30. L. E. M. Gillman, to H.Q., Iraq Command, Hinaidi, 29.9.30. W. J. Richards, to No. 4 Sqdn., S. Farnborough, 9.10.30. H. H. Brookes, to No. 84 Sqdn., Shaibah, 5.10.30.

*Flying Officers*: P. Coyle, to Home Aircraft Depot, Henlow, 17.10.30. R. F. Part, to No. 60 Sqdn., Kohat, 7.10.30. J. R. Mathews, to Aircraft Park, Lahore, 1.10.30. M. M. Restell-Little, to R.A.F. Depot, Uxbridge,

12.10.30. D. Dickson, to No. 9 Sqdn., Manston, 25.10.30. W. D. J. Michie, to No. 14 Sqdn., Palestine, 13.10.30.

*Pilot Officers*: A. C. Richardson, to Aircraft Depot, Karachi, 17.9.30. J. A. Nicholson, to No. 11 Sqdn., Risalpur, 17.9.30. T. King, to R.A.F. Depot, Uxbridge, 20.10.30. P. J. W. Hawkins, to No. 3 Flying Training Sch., Grantham, 27.10.30. E. D. Mills, to No. 2 Sqdn., Manston, 20.10.30.

The undermentioned are all posted to No. 3 Flying Training School, Grantham, with effect from 25.10.30:—A. A. Adams, D. J. Bateman, J. A. B. Begg, G. R. Canavan, A. L. Christian, W. I. Clarke, A. E. Clouston, J. A. Dobson, J. N. Dufort, J. A. C. Forbes, E. Foster, W. M. Hargreaves, R. H. Harris, W. H. Husband, N. A. Ireland, L. S. Lamb, L. T. McGinn, J. J. Murphy, L. J. Neale, F. R. Newell, H. L. Pandal, R. A. Phillips, H. Pilling, R. C. J. Rice, D. G. Singleton, F. G. L. Smith, J. G. Younghusband. D. E. Milson, to No. 29 Sqdn., North Weald, 21.10.30.

### Stores Branch

Flight Lieutenant E. W. Lawrence, to No. 45 Sqdn., Helwan, 16.10.30. Flying Officer W. T. Lewis, to Station H.Q., Hendon, 23.10.30.

### Medical Branch

Flight Lieutenant C. P. O'Toole, to R.A.F. Depot, Uxbridge, 20.10.30.

### Dental Branch

Flying Officer C. M. Leckie, to R.A.F. Training Base, Leuchars, 18.10.30.

## IN PARLIAMENT

### Airship R 101 Crew's Dependents

MR. MONTAGUE, on October 30, in reply to Mr. Malone, said the grant of pensions or gratuities to the dependants of those who lost their lives in the R 101 is governed by King's Regulations and Air Council Instructions, in the case of Air Force personnel, and by the Treasury Warrant of January 17, 1919, and the Home Secretary's Aircraft Order of September 19, 1924, in other cases. The nature and amount of these awards vary according to circumstances, but in every case the widow will be entitled to a pension during widowhood, and in most cases the children also will be entitled to pensions. These children's pensions will be payable in some cases to the age of 21, in others to the age of 18, and in others to the age of 16. The House can rest assured that the matter has received the most sympathetic consideration, and that the regulations will not be interpreted in any narrow or grudging spirit.

### Air Mail and Insufficiently Stamped Packets

SIR F. NELSON, on November 4, asked the Postmaster-General if he was aware that packets sent by air mail to or from India when found to be insufficiently stamped are taken off the mail plane and transmitted by steamer; and, if so, whether, in view of the delay and hardship to senders and recipients, he will take steps to secure instead the procedure of collecting the deficiency at the destination?

MR. VIAN: I am aware of this practice, which is prescribed by international regulations. Insufficiently stamped letters are, however, forwarded by air mail when the underpayment is obviously due to an error in weighing, and in other cases efforts are made, when the senders are known, to give them an opportunity of making up deficiencies. As regards the second part of the question, in many cases the recipients would undoubtedly refuse to pay the sums involved, which are often considerable, and I regret that I am not able to adopt the suggestion.

### Airships

MR. MONTAGUE, on November 5, in reply to Mr. Day, said the cost of upkeep of R 100—including pay and wages of officers and crew, cost of hydrogen and overhead charges—could normally be taken as approximately £600 a week. This, however, is the cost of keeping the airship in flying condition, with running repairs. The present expenditure is considerably less, but no definite weekly figure can be quoted. As regards the use of R 100 no decision will be made until the report of the Court of Inquiry now investigating the loss of R 101 has been received and considered in all its bearings on future airship policy.

MR. MONTAGUE, in reply to Mr. Wise, said the only airships begun and built since the armistice are the R 100 and R 101, but work was done after the armistice on five other airships which were then under construction, namely, R 33, R 36, R 80, R 38 and R 37. All except the last of these were completed. The cost of construction of each of the airships was approximately as follows: R 33 and R 36, £350,000 each; R 80, £275,000; R 38 £500,000; R 37 (not completed), £325,000; R 100, £350,000 (contract price); R 101, including insertion of additional bay and other alterations, £640,000. The two German airships taken over at the armistice were dismantled some time after delivery, being unsuitable for the Air Ministry programme; the total expenditure on them was approximately £1,000.

In reply to Mr. Malone, Mr. Montague said R 100 is at present being deflated, and concurrently a full inspection of the hull structure is in progress, together with minor repair work. Later the cover will be removed. The airship has not yet been formally accepted by the Air Ministry pending the completion of certain repairs made necessary on the trial flight. A decision as to the further use of R 100 will not be taken until after the investigation into the loss of airship R 101 has been completed. For this purpose, the results of the investigation, which is, however, specifically directed to the loss of R 101, will be taken into consideration, in common with a number of other factors. £337,000 has already been paid to the Airship Guarantee Company; a further payment of comparatively small amount will become due on satisfactory completion of repairs; its amount cannot yet be definitely stated.

### Control of Aviation

COMDR. BELLAIRS, on November 11, asked the Prime Minister whether he would appoint a public inquiry, such as was held in the United States of America under the chairmanship of Dr. Dwight Morrow, into the whole question of the Air Force, its military and civil associations, and how our present system compared with the systems in America and Japan, where civil flying was under separate control and military flying was part of the Navy and Army respectively.

MR. MACDONALD: The answer is in the negative. His Majesty's Government have no intention of departing from the policy of successive Governments with regard to a separate air arm and Air Ministry, or as regards the control of civil aviation. In reply to the second part of the question, it is the fact that in America and Japan air administration is divided between three separate departments. On the other hand, France and Italy, with the two largest Air Forces in the world, have adopted the British system.

## CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

### FORWARD ELEVATORS FOR AIRSHIPS

[2347] In connection with the loss of the airship R 101, may I bring a point to your notice.

It seems to me that the problem of the submarine and the airship is similar.

For many years submarines were fitted with after hydroplanes only; if the bow of the ship dropped for any reason, the only method of bringing the ship horizontal was to put the after hydroplanes to "rise," thereby bringing the stern down, the submarine thus going considerably deeper.

To obviate this forward hydroplanes were fitted, which enabled the submarines to gain or lose depth in a horizontal position, and little depth being gained or lost, when cruising at a certain depth.

If an airship were fitted with forward elevators, it seems to me, she should be able to maintain a horizontal position without losing height through the nose dropping, and be able to gain or lose height without much angle being put on the ship.

It appears that R 101 struck the ground because the nose dropped, the elevators were worked to take the angle off the ship, height was lost. The nose again dropped, more height was lost in bringing the ship level, in doing so the ship struck the ground.

LAURENCE RICH

Army and Navy Club,  
Pall Mall, S.W.1.  
October 11, 1930.

### BRITISH AIRCRAFT IN CANADA

[2348] As a reader of your paper and a keen follower of aviation for a good many years, I write you as follows, hoping in my small way to stir up interest among the British Aircraft Constructors to the wide field which they are neglecting in Canada.

It is needless for me to mention any developments in regard to aviation in Canada. You are aware of the facts, or have them at your command. As to its future, it is quite obvious, through Canada's geographic position and widely separated centres of population.

What should concern the British Aircraft Constructors is, what future it holds for them. Surely the field, small as it is, in comparison to other countries, is worthy of a thorough investigation. When one reads a list of types of aircraft registered in Canada, machines of British design are noted for their absence. Great Britain has well-established markets in Canada for numerous other products. Why is it that another country can gain such a grip on Canada in regard to aircraft? We read how British types are known all over the world for their superiority. Why neglect Canada?

Aircraft will be carrying the mail across the Rockies next year. Vancouver's new airport will be opened this fall. Here is one small field open for investigation. If the British aircraft constructors do not interest themselves the opportunity for the sales of their aircraft will be lost.

In my humble opinion it would surely pay the aircraft constructors of Great Britain to thoroughly investigate the field in Canada and learn just what types are required for the proposed developments. Build the aircraft and then approach the operator with what is the best-suited type to his purpose.

L. Z. DIXON.

Vancouver, B.C.  
October 16, 1930.

### R.A.F. SPORT

#### ASSOCIATION FOOTBALL

**R.A.F. v. Cambridge.**—The R.A.F. beat Cambridge University at Soccer on Saturday, November 8, at Ilford, by 5 goals to 3. The Service proved much the better side and played high-class football. Robinson, the centre half, gave a very polished display, worthy of an amateur international. He kept his forwards well fed, and they were quite able to take full advantage of the chances which he gave them. Vernon at centre forward was the spear head of the attack. Not only did he score three goals himself, but he kept his wings fed with excellent judgment. The score for the R.A.F. might have been higher but for the excellent defence of Edwards, the Cambridge goal keeper. The teams were:—

**Royal Air Force.**—L.A.C. Cooper; A.C. Flynn, Sgt. James; A.C. Hamlet, Cpl. Robinson, A.C. Bulmer; A.C. Parrish, Sgt. Acquaroff, L.A.C. Vernon, A.C. Oates, A.C. Hickey.

**Cambridge University.**—G. G. Edwards (Hong Kong and Downing); J. A. Cook (Westminster and Peterhouse), G. Blackton (Tiffin and Emmanuel); P. R. Vassar-Smith (Lancing and Pembroke), W. H. Lister (Malvern and Pembroke), C. G. D. Long (St. Edmund's, Canterbury, and Trinity); A. H. Fabian (Highgate and Pembroke), F. K. Reeves (Highgate and Clare), G. D. Kemp-Welch (Charterhouse and Sidney Sussex), G. R. Moxon (Shrewsbury and St. John's). W. H. Webster (Highgate and Pembroke).

Referee: H. Bartholomew.

## PUBLICATIONS RECEIVED

*Dominion of Canada Department of National Defence: Report on Civil Aviation and Civil Government Air Operations for the Year 1929.* Department of National Defence, Ottawa, Canada. Price 25 cents.

*Night Raiders of the Air.* By A. R. Kingsford. John Hamilton, Ltd., 42, Great Russell Street, London, W.C.1. Price 7s. 6d.

*Mit Graf Zeppelin nach Süd-u. Nordamerika.* By J. Breithaupt. Moritz Schauenburg K-G., Lahr, Baden, Germany. *Almanacco Aeronautico* 1930. Valentino Bompiani and Co., Via Durini, 24, Milan, Italy.

*Jahrbuch 1930 der Deutschen Versuchsanstalt für Luftfahrt, E.V.* Compiled by Dr.-Ing. W. Hoff, Munich: R. Oldenbourg. Price M.58.

*Aeronautical Research Committee Report for the Year 1929-30.* H.M. Stationery Office, London, W.C.2. Price 1s. 6d. net.

*Report on the Health of the Royal Air Force for the Year 1929.* H.M. Stationery Office, London, W.C.2. Price 1s. 3d. net.

*The Meteorological Glossary. Second Edition.* M.O.225.ii. Air Ministry, Meteorological Office. H.M. Stationery Office, London, W.C.2. Price 4s. 6d. net.

*The Glory of Britain.* By David Masters. London: John Lane, The Bodley Head, Ltd., Price 8s. 6d. net.

*Aeronautical Research Committee Reports and Memoranda: No. 1318 (E. 35).—Detonation and Lubricating Oil.* By R. O. King and H. Moss. Jan., 1930. Price 1s. 3d. net. *No. 1326 (E. 37).—Wind Tunnel Experiments on Steam Condensing Radiators.* By R. G. Harris, L. E. Caygill and R. A. Fairthorne. June, 1930. Price 1s. 6d. net. *No. 1330 (Ae. 462).—Maximum Force on the Fin and Rudder of a Bristol Fighter.* By F. B. Bradfield and R. A. Fairthorne. May, 1930. Price 4d. net. *No. 1331 (Ae. 463).—Hinge Moments of Balanced and Unbalanced Ailerons on R.A.F.14 Wing, to Large Angles of Incidence.* By F. B. Bradfield and R. A. Fairthorne. May, 1930. Price, 9d. net. H.M. Stationery Office, Kingsway, London, W.C.2.

*The Romance of a Modern Airway.* By Harry Harper. London: Sampson Low, Marston Co., Ltd. Price 6s. net.

*Amendment List No. 14 to Air Publication 1208.* H.M. Stationery Office, London, W.C.2. Price 2d. net.

*Bibliothèque de feu M. le Comte Henry de la Vaulx.* Ch. Bosse, 16-18, rue de l'Ancienne-Comédie, Paris.

*Solo to Sydney.* By F. C. Chichester. London: John Hamilton, Ltd. Price 7s. 6d. net.

*Report on the Conditions and Prospects of British Trade in India, 1929-30.* By Thomas M. Ainscough, C.B.E. H.M. Stationery Office, London, W.C.2. Price 3s. 6d. net.

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### AERONAUTICAL PATENT SPECIFICATIONS

(Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

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